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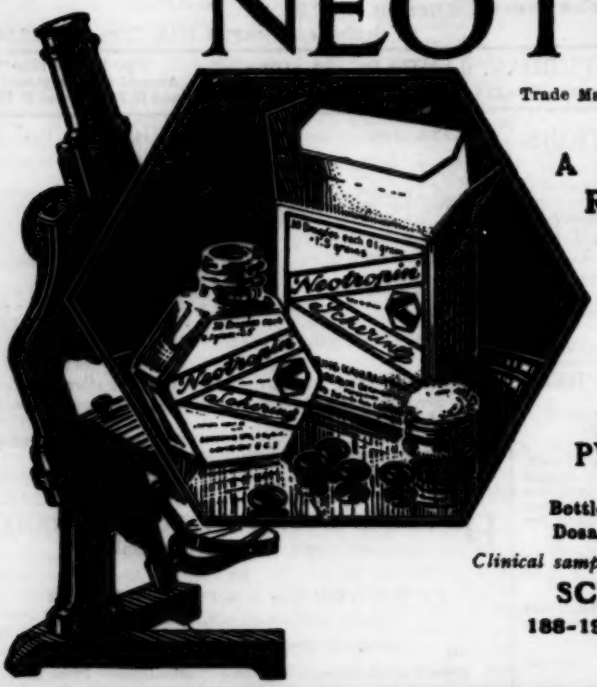

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ADDRESSES AND ORIGINAL ARTICLES

DIVERTICULA OF THE DUODENUM AND JEJUNUM*

BY HAROLD C. EDWARDS, M.S. Lond., F.R.C.S. Eng.
JUNIOR SURGEON TO KING'S COLLEGE HOSPITAL, LONDON

WHEN, more than a hundred years ago, Meckel established the ætiology of the diverticulum which bears his name, he separated intestinal diverticula into two groups, which he called "true" and "false." He defined a true diverticulum as one identical in structure with the intestine from which it arises, and consisting therefore of the four coats mucosa, submucosa, muscularis, and serosa. All such diverticula arise, in Meckel's view, from the vitello-intestinal duct. The false diverticulum differs from this in that "its form is more rounded, by the absence in it of superimposed tissue, by its frequent occurrence in the duodenum, and by the existence of several at once." This description applies to the acquired mucous-membrane-hernia type of diverticulum which occurs so frequently throughout the greater part of the intestinal tract.

Though Meckel's classification laid the foundation, it does not satisfy the present-day knowledge of intestinal diverticula. Recent observations show that not all "true" or congenital diverticula arise, as Meckel suggested, from the vitello-intestinal duct. Some are associated with ectopic pancreatic nodules, and some result from reduplication of bowel, while others are related to cysts of the gut wall. Similarly acquired diverticula are not confined to the hernial type, but may be due to disease affecting the bowel wall. The outstanding example of this is diverticulum of the first part of the duodenum associated with ulcer. A further type of diverticulum is that caused by traction upon the wall of the intestine by a neighbouring viscus. In both of these types, all four coats of the intestine are present in the diverticulum. Finally, one must include pseudo-diverticula, such as may result from the formation of a choledocho-duodenal fistula. Thus the following classification is evolved.

A. Congenital diverticula.
   1. Meckel.
   2. Non-Meckelian.
      (*a*) Giant diverticula.
      (*b*) Diverticula associated with ectopic pancreatic nodules.
      (*c*) Cyst-like diverticula.

B. Acquired diverticula.
   1. Primary or hernial type.
   2. Secondary.
      (*a*) Diverticula due to disease of the bowel wall—e.g., ulcer diverticulum of the duodenum.
      (*b*) Traction diverticula.
   3. Pseudo-diverticula.

I shall confine myself in this lecture to the consideration of acquired diverticula of the duodenum and jejunum.

The Duodenum

Fig. 1 illustrates a typical primary diverticulum of the second part of the duodenum, obtained post mortem from a woman of 62, in whom also were found diverticula of the colon. The diverticulum was diagnosed radiologically before death.

The duodenum has been opened by cutting along its anterior wall, and bristles have been placed in the ampulla of Vater and the opening of the duct of Santorini. The major ampulla is unduly prominent. Its right margin is continuous with a transverse fold, which forms the anterior lip of a wide-mouthed diverticulum, and which then continues as a well-defined fold on the posterior and right lateral wall of the duodenum. The direction of the long axis of the diverticulum is to the left and slightly upwards and backwards, following the direction of the common bile-duct as it traverses the duodenal wall.

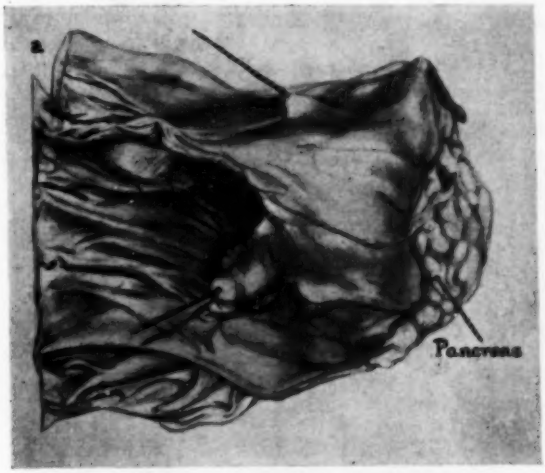

FIG. 1.—Primary diverticulum of the duodenum. For description see text.

From the posterior aspect, the diverticulum can be seen as an ill-defined bulge of the duodenal wall towards the pancreas. It is separated from the latter by a narrow interval filled with loose areolar tissue, and the pancreas can be freed by blunt dissection. The mucous membrane lining the pouch is smooth and free from rugæ, but otherwise normal. Microscopic section shows a complete absence of muscle coat at the fundus.

In two other specimens, for which I am indebted to Mr. P. N. B. Odgers, the morbid anatomy and relations of the diverticula are identical with those of the specimen described. In a further case, illustrated in Fig. 2, two diverticula are present in the transverse part of the duodenum. One of these was removed for serial section, and its presence is indicated in the drawing by a dotted line. The heavy interrupted line passes along the midline of the concavity of the duodenum, and the blood-vessels supplying the duodenum are in two groups, one anterior and the other posterior to it. The opening of each of the two diverticula is to the posterior side of the midline, and in relation to the posterior group of vessels. This relation is well shown in the smaller diverticulum, in which the artery has been cut across.

A microscopic section through the maximum diameter of the diverticulum removed shows a complete absence of a muscle coat, which ceases abruptly at the mouth. The muscle in the angle between the intestine and the pouch is thicker than elsewhere in the duodenum, and appears to have undergone a certain amount of hypertrophy. The blood-vessel referred to is clearly seen. No pancreatic tissue nor Brunner's glands are present.

* A Hunterian lecture delivered before the Royal College of Surgeons of England on Jan. 22nd. The lecture, with one to be published in a subsequent issue, forms part of the Jacksonian prize essay for 1932.

The situations of the mouths of diverticula of the transverse part of the duodenum may be to either side of the midline, or, if the diverticulum be a large one, the mouth may actually cross it. The situations to either side are determined by the blood-vessels, which, as dissection of the normal duodenum after injection of the arteries shows, are arranged in two sets, anterior and posterior, as a result of early division of the superior pancreatico-duodenal artery

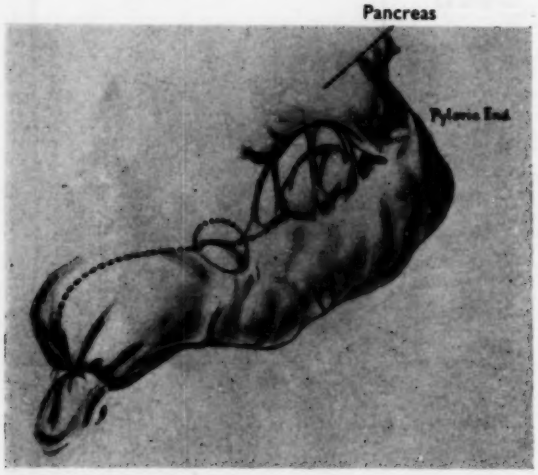

FIG. 2.—Diverticula of the transverse part of the duodenum. For description see text.

into anterior and posterior branches (Fig. 3). A large diverticulum, whose mouth crosses the midline, is probably formed as a result of fusion of two small lateral ones, in a manner similar to the formation of large diverticula of the jejunum (q.v.).

DEFINITION

A primary acquired diverticulum of the duodenum is thus a thin-walled sac, opening from the concave surface of the bowel at a point corresponding to the penetration of the wall by a biliary or pancreatic duct,

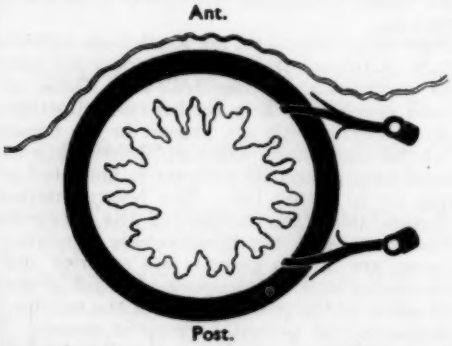

FIG. 3.—Diagram of transverse section through the transverse part of the duodenum, showing the relation of the anterior and posterior row of blood-vessels to the wall of the bowel.

or by a blood-vessel. In my five cases (four post-mortem and one operation) the fundus of the sac is devoid of a true muscle coat. This may end abruptly at the mouth of the diverticulum, or be present at the edge, rapidly attenuating as the fundus is reached. Microscopic examination failed to reveal any other abnormality of the wall of the diverticula, such as aberrant pancreatic nodules, which can be regarded as a congenital cause for the development of the pouches.

INCIDENCE

During the seven-year period, 1925–1931, diverticula of the duodenum were found in 31 of 4631 examinations, an incidence of 0·7 per cent. This estimate is, however, too low, as the figures for each individual year show. These are as follows:—

Year.	X rays.	Cases.	Percentage.
1925	521	1	0·2
1926	580	1	0·2
1927	630	1	0·2
1928	653	6	0·9
1929	612	9	1·5
1930	781	7	0·9
1931	854	6	0·7

It will be noticed that the percentage incidence jumped between the years 1927 and 1928 from 0·2 to 0·9 per cent., which figure has been maintained in the succeeding years. This jump in incidence coincides with a remodelling of the technique employed in the routine examination, the chief added feature being the screening of all cases in the oblique position. With further improvements in the technique, the figures show a corresponding rise. For the first eight months of 1933, 10 cases were found in 547 examinations, an incidence of 1·8 per cent.

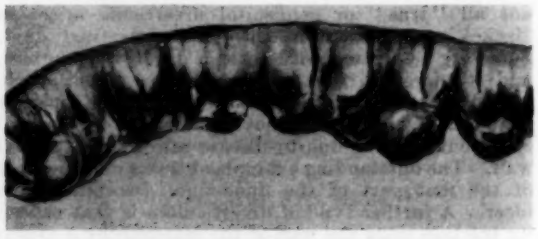

FIG. 4.—Diverticulosis of the jejunum. For description see text.

Easily the most common situation in the duodenum is the second part. In 42 cases the situation is as follows:—

1st part	2nd part	3rd part
0	33	10*

* One case with two pouches.

In 249 cases from all sources, 182 are in the second part and 67 in the third.

All the diverticula are on the concave aspect of the bowel, and of those in the second part, by far the greater number are closely related to the opening of the common bile-duct, and are hence termed perivaterian by French authors.

The Jejunum

The further from the pylorus, the less frequently are primary acquired diverticula of the small intestine found. They are exceptionally rare in the ileum, being found only in cases of severe diverticulosis of the small bowel, the brunt of which is borne by the jejunum. The most common type of diverticulum found in the ileum is the congenital, even if Meckel's diverticula be excluded.

In a series of ten specimens of hernial diverticula of the jejunum investigated, three are multiple and seven single. In two further radiological cases the diverticula were multiple. In one of the specimens (Fig. 4), 18 diverticula are present at the upper end of the jejunum, commencing two inches from the flexure.

The pouches vary from the size of a split pea to that of a chestnut, and are all situated at or near the mesenteric border. A well-defined blood-vessel runs in the wall of each pouch.

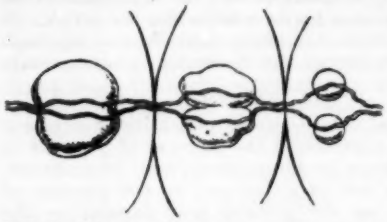

FIG. 5.—Diverticula viewed from the mesenteric aspect (semi-diagrammatic). For description see text.

Viewed from the mesenteric aspect, the largest pouches are seen to bestride the mesenteric angle, lying within the leaves of the mesentery. The opening of these pouches into the jejunum is a wide one, and is placed symmetrically over the line of the normal mesenteric attachment. The smallest diverticula lie, however, to one side of the mesentery, and their opening into the bowel is lateral to the line of mesenteric attachment. Each of these small diverticula is paired. Its fellow is situated equidistant from the mesentery and on its opposite side. The diverticula intermediate in size are bilobed. The mouth of each bestrides the mesenteric line, and the

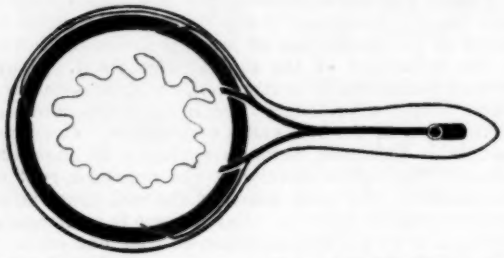

FIG. 7.—Diagram of transverse section of the jejunum, to show the relation of the blood-vessels to the wall of the bowel.

leaves of the mesentery are reflected away from the intestinal wall as in the case of their larger neighbours. At the fundus, however, there is a grooved depression in the long axis of the diverticulum, corresponding to the line of normal attachment of the mesentery, and giving each diverticulum its bilobular character. This is shown semi-diagrammatically in Fig. 5. On opening the bowel along the mesenteric line, the separate mouths of the smaller diverticula are clearly seen, one on either side of the line. Each is sheltered by a valvula connivens (Fig. 6).

The mode of formation of the large pouches is made clear by these observations. Each started as a pair of pouches, one to either side of the mesenteric line Later in development each of the pair increased in size until the two met in the midline, and the thin strip of bowel which separated them originally became taken up, and the diverticula fused. At this stage fusion was indicated by the median groove on the mesenteric aspect. Eventually the median groove

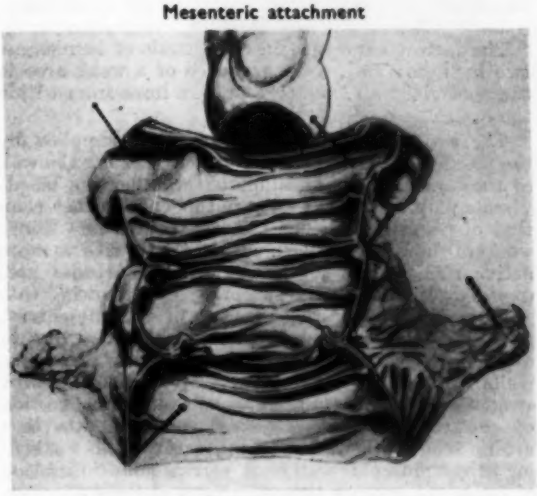

FIG. 6.—The specimen illustrated in Fig. 4 opened by dividing along the mesenteric line. Note the paired diverticula.

became obliterated, and a single smooth-walled diverticulum resulted.

The point thus established is that the site of commencement of these diverticula is not at the line of attachment of the mesentery to the bowel, but to one or other side of it. This situation corresponds exactly to the points of entry of the blood-vessels through the muscular coat of the intestine (Fig. 7).

The microscopic appearance of one of the smaller diverticulum is shown in Fig. 8. The pouch is hemispherical in shape, and opens into the bowel by a wide mouth, which is bounded on one side by a valvula connivens. At the fundus of the pouch is an artery and vein. Except for the absence of rugæ, no abnormality is seen in the lining membrane. The wall is thinner than that of the intestine, and this is due entirely to the difference in width of the respective muscle coats. The fibres of the intestinal muscularis are heaped up in the angles between the diverticulum and the intestine, and at this point a firm prominent ridge is felt in the wet specimen, almost like a sphincter. At the commencement of the diverticulum the muscular coat is pushed back upon itself, and is then continued into the diverticulum as a thin layer, not more than two to three fibres thick, and this attenuates still further as the fundus is reached. The muscularis mucosæ is intact.

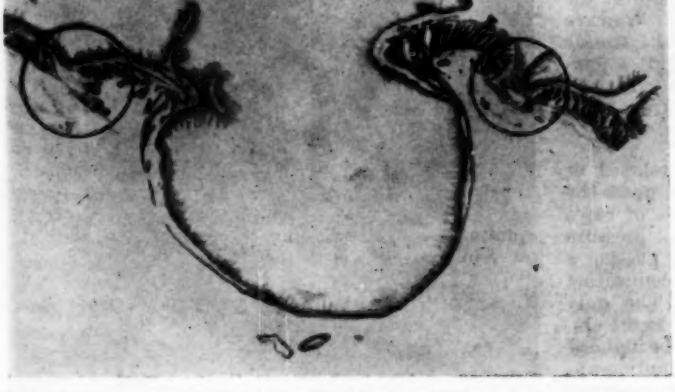

FIG. 8.—Microscopic section (six diameters) of a jejunal diverticulum, from the specimen illustrated in Fig. 4.

These appearances strongly suggest that the mucous membrane of the jejunum has been pushed through

a weak area in the muscular wall of the bowel, carrying with it a few layers of muscle-fibres. The point of origin of each diverticulum, it has been shown, corresponds with the penetration of the wall of the bowel by a blood-vessel. The pouches must be regarded, therefore, as hernias of the mucous membrane of the bowel through the muscular coat at points weakened by the passage of the blood-vessels. Thus primary acquired diverticula of the duodenum and jejunum are of similar origin, their differences being those determined by anatomy only, and an ætiology which does not satisfy both must be rejected for either.

Pathogenesis

The factors concerned in the genesis of hernias are two in number: (*a*) the presence of a weak area in the muscular wall; and (*b*) a pulsion force from within the bowel.

The weak area.—The weak areas are supplied by the passage of ducts or blood-vessels through the wall of the bowel. It is questionable whether the blood-vessels play any part in the pathogenesis other than that of providing a locus minoris resistentiæ. Many workers, however, have credited them with a more active rôle. Klebs suggested that the arteries produced traction upon the submucous coats owing to a gradual increase in the breadth of the mesentery. Sudsuki suggested that the weak areas were due to degeneration of the connective tissue of the veins, while Graser, sometime previously, had suggested stretching of the vascular gap as a result of congestion of the veins. A more recent view suggests that arterio-sclerosis is an important factor, while weakening of the muscular wall from perivascular infiltration of fat is yet another theory. None of these theories, however, receives constant support from the specimens examined. The same may be said of theories of a primary myogenic weakness, such as fatty degeneration of the muscle (Roth), congenital hypoplasia (Buzzi), and toxic myositis.

In regard to perivaterian diverticula, the suggestion has been made that the initial cause of herniation is traction by the common bile-duct as the result of duodenal ptosis, but this is placed out of court by the inconstancy with which diverticula and ptosis are associated.

The pulsion factor.—As the presence of ducts and blood-vessels is common to all individuals, we must turn to this second factor to explain why diverticula occur in a certain percentage of the population. The pressure inside the bowel depends upon two factors: (*a*) the contents, and (*b*) the contractions of the muscular wall. We are very largely ignorant of the variations in pressure which occur during life in the duodenum and jejunum. Experimental evidence obtained by placing balloons in segments of intestine isolated by operation, or introduced through a jejunostomy opening, is open to considerable criticism, and one must be cautious in accepting data from these sources.

THE DUODENUM

The condition of the pylorus, whether relaxed or closed, must exert a considerable influence upon the pressure inside the duodenum. In a series of cases an attempt was made to estimate duodenal pressure by my colleague, Dr. Charles Newman, by passing a radio-opaque tube into the duodenum and connecting the distal end to a water manometer. The only positive finding was a variation of from 0·5 to 0·1 cm. during inspiration. That high pressure can be induced in the duodenum is shown, however, by the radiogram of a barium meal shown in Fig. 9, in which duodenal contraction has forced barium into the hepatic ducts

A further evidence of high pressure is the formation of secondary diverticula as the result of ulcers of the duodenum (q.v.). Perry and Shaw suggested that the pylorus is largely responsible for a rise in intraduodenal pressure in opposing by its contraction the reflux. It must be concluded, therefore, that abnormally high pressures can occur in the duodenum under certain circumstances.

THE JEJUNUM

Under normal conditions of peristaltic movement and segmental contraction the increase of pressure in the jejunum must be momentary and insignificant, for there is no bar at either end to the passage of contents, such as the pylorus may furnish to the duodenum. Can the passive force of the contents of the jejunum create a sufficient pressure to cause herniation? No intrajejunal pressure under ordinary circumstances can approach in power that present in acute small intestine obstruction, but this condition does not give rise to diverticula. Experiments by distension with air or water of the intestine after death are entirely without value, for the strength of the intestinal wall is dependant upon the power of its musculature to contract. In Chlumsky's distension experiments upon the living intestine no diverticula were produced, the bowel eventually rupturing on the antimesenteric border.

Passive distension alone cannot therefore be responsible for the formation of diverticula. The unknown factor in the production of pressure inside the lumen is the behaviour of the muscle coat itself. Under normal conditions of contraction, as far as we understand them, a prolonged rise in pressure does not occur either in the duodenum or jejunum. One must postulate, therefore, some irregularity in muscular action. The better developed the muscular coat of the intestine, the more resistant the wall must be to passive pressure upon it. But if there is an irregular contraction of the muscle-fibres, so that one set is in spasm and the adjacent ones relaxed, a considerable alteration from the normal occurs both in the local pressure produced inside the lumen and the resistance

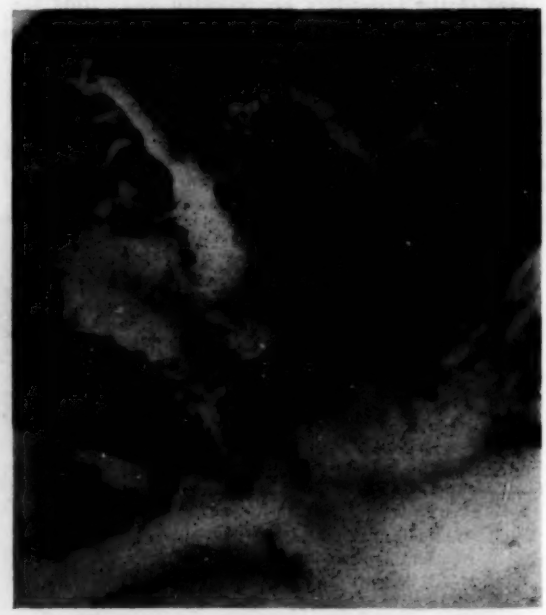

FIG. 9.—Radiogram obtained during the course of a barium meal, showing the bile-ducts filled with barium. (See text.)

of the wall to that pressure. In support of a theory of abnormal behaviour of the muscle coat as the cause of development of diverticulosis may be mentioned the hypertrophy of the muscularis noted in many recorded cases, and present in an operation specimen soon to be described. The nature of the abnormal behaviour of muscle responsible for the development of diverticulosis will be considered in more detail in my next lecture on diverticula of the colon.

The Clinical Aspect

DUODENUM

Of 27 of my cases of duodenal diverticula, other pathological conditions were present in 15, in 8 of these cases the accompanying lesion being diverticulosis of the colon. Of the remaining 12 cases clinical and radiological examination showed no other abnormality. In 3 of these the diverticulum was a very small one, and the symptoms were vague and could be accounted for by constipation only.

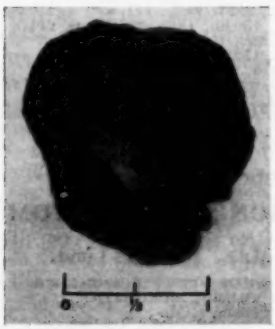

FIG. 11.—Perivaterian diverticulum removed at operation. Scale in inches.

The remaining 9 cases can be separated into two groups:—

1. In whom the symptoms are those of a flatulent dyspepsia.

2. In whom there is definite epigastric pain after food.

Presumably the symptoms of the first group result from retention of intestinal contents in the diverticulum, and the latter from inflammation of its wall (diverticulitis). The symptoms of both groups may naturally be present in the same case. The symptomatology is, however, not sufficiently distinctive to enable a clinical diagnosis of diverticula of the duodenum to be made with any degree of assurance, and this can only be done by radiography. Great care must be exercised in attributing these digestive disturbances to the presence of the diverticulum, and a complete examination of the alimentary tract and of the gall-bladder must be made to exclude the possibility of another cause for the symptoms. Even in those cases in which a search for another cause proves fruitless, one must be cautious in attributing the symptoms to the diverticulum unless X ray examination shows barium retention over a considerable period. In diverticula of the second part and of the ascending limb of the third part there is usually some degree of retention after the duodenum empties, due in part to the position of the pouch and in part to the absence of muscular tissue in its wall. When the retention is more marked, such as in Fig. 10, the diverticulum may fairly be regarded as the cause of the symptoms. The combination of retention and large size of the diverticulum is of more significance still. In such cases the treatment is operative.

Operation.—The procedure to be adopted is removal of the diverticulum. The operation is not lightly to be undertaken, and one must insist once again on the importance of excluding all other possible causes for the symptoms.

The common type of diverticulum—the perivaterian—is hidden from view by the head of the pancreas, and can only be exposed by incising the peritoneum on the right side of the duodenum, and turning the latter over to the left. The diverticulum is separated from the pancreas by blunt dissection, and its close relation to the common bile-duct must be borne in mind. When completely freed, the base of the pouch is clamped and the latter removed, and the duodenal wall repaired. In cases of difficulty it is justifiable to make an incision through the anterior wall of the duodenum just large enough to admit the index-finger, and assisting dissection by introducing the latter into the diverticulum.

FIG. 10.—Radiogram before operation, showing diverticulum filled with barium 24 hours after the commencement of the meal.

Though more difficult to expose, diverticula of the third part of the duodenum are more easily removed, owing to their freedom from such structures as the common bile-duct. Those at the flexure may, however, burrow to the right, under the peritoneum, and in such an event will become closely related to the aorta and inferior vena cava.

Fig. 11 shows a perivaterian diverticulum removed at operation from a woman of 54. It is a thin-walled sac, devoid of a muscular coat and having a cubic capacity of 14·5 c.cm. The radiological appearance is shown in Fig. 10. The patient was admitted into King's College Hospital under the care of Dr. J. L. Livingstone. She complained of abdominal pain, with occasional sickness, and a distressing amount of flatulence after meals. The history extended back for some nine or ten years, and the symptoms had become progressively worse despite periods of treatment elsewhere for gastric ulcer. Six years before admission appendicectomy had been done, with no relief. No other cause for the symptoms was demonstrated, and removal of the diverticulum in the manner described above resulted in a complete cure of the distressing flatulence. The patient still complains of occasional pain, but this has very greatly improved, and eleven months after operation her weight had increased from 7 st. 6 lb. to 8 st. 10 lb.

FIG. 12.—A segment of jejunum removed at operation for diverticulosis. (See text.) The nodule on the antimesenteric border is ectopic pancreatic tissue.

THE JEJUNUM

The majority of jejunal diverticula do not appear to be responsible for symptoms, though in one case in this series, operated upon by my colleague Mr. St. J. D.

Buxton, the diverticulum had become gangrenous, and a successful resection of gut was performed. There is some doubt in my mind, however, as to whether this particular case was of the hernial type or whether it belonged to the cystic type of congenital diverticula. It had a very minute opening into the bowel, and the inflammatory changes in the wall were too gross to enable one to get a microscopic picture of its normal anatomy.

In cases of multiple diverticula, the chief symptoms seem to be vague abdominal pain and discomfort, accompanied by flatulence. A symptom distressing to the patient may be loud rumbling noises after meals. The diagnosis is made by radiography, and

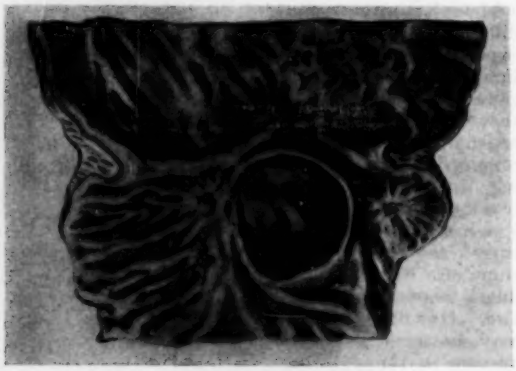

FIG. 13.—Ulcer diverticulum of the first part of the duodenum. Two healed ulcers are present.

some estimation of the part played by the diverticula in the causation of symptoms may be made by noting their size and the degree of retention in them. No treatment but operation is likely to be of any value, but again one must be careful to exclude any other cause for the symptoms. In diverticulosis of the jejunum the operation consists of complete resection of the portion of intestine affected.

Fig. 12 is drawn from a specimen removed at operation by my senior colleague, Mr. Arthur Edmunds, from a woman of 38. It consists of a portion of the upper part of the duodenum, and bears eight diverticula of varying size, identical in all respects with those of the specimen previously described. The muscular wall of the intestine removed shows definite evidence of hypertrophy. A small ectopic pancreatic nodule is seen on the antimesenteric aspect of the bowel. The condition was diagnosed by X rays before operation.

Secondary Diverticula

Traction diverticula occur chiefly in connexion with an adherent gall-bladder, and are not of very great significance. Easily the most important type of secondary diverticulum is that associated with duodenal ulcer. In contradistinction to primary diverticula, the ulcer diverticulum occurs only in the first part of the duodenum, and is revealed more readily at operation than by means of X rays. The diverticula form as a result of healing of the ulcer, and are not due to yielding of the wall of the duodenum at the site of the ulcer. As a result of the scar contraction of a healed ulcer, the wall of the duodenum may become considerably shortened. In one of the seven specimens, for all of which I am indebted to Prof. M. J. Stewart, the degree of shortening measured 3·6 cm. As a result that part of the duodenum in the neighbourhood of the ulcer becomes relaxed, and is ballooned out by intraduodenal pressure.

The diverticula are for the most part shallow and wide mouthed, with smooth lining walls. The muscular coat shows no deficiency, but may be slightly thinner than in the normal bowel. They may be single, but are more frequently multiple. The distribution in the seven specimens referred to is as follows:—

2 cases	with 1 ulcer	and 1	diverticulum.	
1 case	,, 2 ulcers	,, 1	,,	(Fig. 13.)
2 cases	,, 2 ,,	,, 2	diverticula.	
1 case	,, 2 ,,	,, 3	,,	
1 ,,	,, 2 ,,	,, 4	,,	

These diverticula have no special clinical significance beyond the fact that their presence in the duodenum is eloquent of the existence of a healed ulcer or ulcers. With their wide mouths and muscular walls it is improbable that they will of their own accord give rise to symptoms.

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SIGHING RESPIRATION AS A SYMPTOM

BY DORIS M. BAKER, M.D., M.R.C.P. Lond.

ASSISTANT PHYSICIAN TO THE SOUTH LONDON HOSPITAL FOR WOMEN; PHYSICIAN IN CHARGE, RHEUMATIC SUPERVISORY CLINIC, L.C.C.

WHILE investigating the significance of left inframammary pain [1] I was struck with the frequency with which patients coming to clinics both at the National Heart Hospital and at two general hospitals complained of a symptom termed by them shortness of breath, but which on inquiry was found to be no true dyspnœa but a curious disorder of breathing variously described as "difficulty in taking a deep breath," "taking deep sighs," "inability to take a satisfying breath," or even "stifling or suffocating turns." Further, these breaths had for the most part to be taken when at rest, in the evening when tired, or under the stress of excitement as, for example, when under the nervous strain of being questioned at the clinic; and not, as so typically with cardiac patients, during exertion. These encounters led me to take notes on patients showing sighing as a prominent feature, whether or not it was their chief complaint.

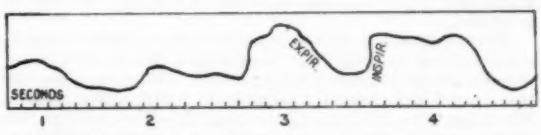
On turning to the literature I was at first unable to find references to sighing as a medical symptom; but later, on putting together my results, I was pleased to discover three papers—and there may be others—on this subject. In 1927 Mund and Wassermann [2] investigated sighing breathing and came to the conclusion that it represented as a rule a slight form of cardiac dyspnœa and a reaction to an insufficient blood aeration; they thought that its association with Cheyne-Stokes breathing in heart cases was clinically of diagnostic significance. In 1929 Paul White and Richard Hahn [3] reported on a study of the symptom of sighing, particularly as it concerned cardiovascular diagnosis. They found it a common symptom, especially in young women in the third decade. Further statistical analysis showed that it

was relatively rare in heart disease with or without congestive failure, in the absence of effort syndrome or marked nervousness, and that when present it came from the nervous state and not from the heart. They concluded that it was a symptom of nervous origin not dependent on disease of the heart, lungs, kidneys, or thyroid gland. In 1933 Gallavardin,[4] in an article on the syndrome of effort in cardio-aortic affections, commented on a functional diaphragmatic defect, a singular respiratory trouble of a nervous order which had nothing in common with true dyspnœa and manifested itself in repose, being uninfluenced by effort except in very exceptional cases. He stated that the clinical context and a precise description of the disorder made diagnosis simple. That this form of breathing was known to the older writers is clear; it was, however, generally held to be significant of a fatty myocardium. Walshe [5] termed it "suspirious," and referred to it as a symptom of pseudo-angina—"the breathing became panting and suspirious." W. T. Gairdner [6] considered it to be "in some way related to lesions involving the respiration through the cardiac nerves"; he also called it "suspirious respiration."

That it is a common disorder there seems no doubt, not only in patients with left inframammary pain but also in those suffering from a nervous disturbance or impaired general health; yet on inquiry it seems to be unknown and unrecognised in practice; familiarity with the symptom therefore does not seem to explain its neglect. The importance of its ready recognition, since it is so frequently associated with nervous affections of the cardiovascular system, seems to be threefold. First, it should be a valuable aid in diagnosis since, having established the character of the so-called "breathlessness," it can be accepted as a neurosal disturbance, trivial in its significance and a sign of nervous instability and not of organic disease. Secondly, when, as is inevitable, it is found in a few cases in association with organic heart disease then, as Paul White and Hahn [3] have pointed out, "it aids much in determining the percentage of responsibility of heart and nervous system in the production of disability in a given case." Thirdly, this disorder is generally referred to by the patient as "shortness of breath," a statement which, if accepted without further questioning, will be misleading and confuse the diagnosis. I have therefore attempted to describe the disorder in such a way as will allow of its ready recognition, even when it presents itself in its most dramatic form; and it can at times assume the aspect of serious disease. This paper is founded upon personal observations made during routine hospital and private work. My thanks are due to Dr. John Parkinson for his advice and help.

THE SYMPTOM

Slight as the significance of this symptom is, yet by its character it assumes a grave importance in the minds of the patient and her relatives, who may even refer to it as "a struggle for breath." Minor degrees are extremely common and patients will say that from time to time they feel compelled to sigh deeply, after which they can breathe comfortably. Others during an attack of this disorder experience a desire to yawn, this if they succeed in doing will allow them to breathe freely and naturally for a time. In the few references to it in the literature it is generally termed "sighing breathing." This does not adequately describe the symptom, since this form of breathing is definitely disagreeable, in that the end of each inspiration is accompanied by a sense of effort as if against an obstruction; by patients of a highly nervous temperament it may be described as a feeling of suffocation, and such a patient will clutch the arms of her chair in an effort to get a satisfying breath. An intelligent patient will readily distinguish between this type of breathing and her normal dyspnœa on effort, which latter could scarcely be described as disagreeable; and whereas the breathlessness of effort is an inevitable result of movement, "suspirious" breathing will appear at any time while sitting, particularly towards the end of the day when the patient is tired, in bed, and very occasionally on or immediately after exertion. The dyspnœa of effort subsides with rest; suspirious breathing, however, will disappear if the patient's attention is distracted from herself, but it will grow more and more troublesome if she concentrates on her discomfort. Whereas in heart disease breathlessness is commonly the only complaint, suspirious patients frequently complain of multiple symptoms, all of a nervous order, as exhaustion, irritability, palpitations, tremblings, and dizziness. The symptom is certainly more common in women than in men, and particularly in women between the ages of 20 and 40 years; I have occasionally observed it in nervous children, generally while waiting to be examined. The majority of the sufferers are undoubtedly of nervous temperament and frequently are depressed, emotional, anxious, and unhappy. No particular build of patient seems to be affected, the symptom being a complaint equally of the stout and the thin. The disorder may disappear for weeks, months, or even years; it tends, however, to reappear with any lowered condition of health or as the result of some anxiety, shock, or worry.



Polygraphic record of sighing respirations. Two normal respirations 1 and 2, followed by two sighing respirations 3 and 4.

The following four cases present the condition in its minor and in its more dramatic form. Case 4 illustrates the observation that in the presence of organic disease, suspirious breathing aids in determining the comparative responsibility of heart and nervous system in the production of disability in any given case; the attack this patient experienced had clearly no relation to the state of her cardiovascular system.

CASE RECORDS

CASE 1.—A married woman, aged 33, came to the out-patient department of the National Heart Hospital complaining that for a few years she had had difficulty in breathing "at times." Attacks might recur every few minutes, yet she might be free from the symptom for a whole day. She stated that she had to force herself to breathe, but a yawn would "put her right." The attacks sometimes troubled her at night in bed, otherwise when she sat down tired after some exertion; not during exertion.

Examination.—Nothing abnormal was found in the cardiovascular system. Pulse regular, 80. Blood pressure 140/80. The patient was reassured and a bromide mixture was ordered.

CASE 2.—A married woman, aged 29, came to the out-patient department of the National Heart Hospital complaining of "breathlessness." This, on inquiry, was described by her as gasping attacks, coming on suddenly at any time. She described her sensation as a sudden

feeling that she "could not get any air," and she would rush out of the house or to an open window taking deep sighing breaths. The attacks lasted a quarter to one hour, and were followed by trembling and a pain under the left breast. Sometimes the attacks would surprise her in the night, and she would jump out of bed and run into the kitchen; her husband, well accustomed to these alarms, sleeping undisturbed Other complaints were palpitations, fear of going out of doors, disturbed sleep, undue exhaustion, and irritability.

Examination.—A thin nervous woman, who while being questioned took frequent sighing breaths. Nothing abnormal was found in the cardiovascular system. Pulse-rate 76, regular. Blood pressure 125/80. X rays showed nothing abnormal in the heart. Electrocardium physiological. Urine normal. Wassermann reaction negative. This patient improved considerably when she was reassured and given tab. luminal, gr. ¼, bis. die; she felt calmer and slept well. Unfortunately, however, her symptoms returned as the result of the shock of a sudden death in the house where she was staying while on holiday; with further treatment she had again improved.

CASE 3.—A married woman, aged 39, came complaining of breathlessness and a pain under the left breast. The breathlessness on inquiry was described as "a struggle to get air into the chest," "a fight for breath," "a suffocating or strangling feeling," which came on whatever she was doing, resting or working, "whether I do anything or not." She said she was always yawning, even in the morning when she was not tired, and that after a yawn her breathing was easier for a time. The pain under the left breast was in the nature of an ache which sometimes spread through to the left shoulder-blade; the skin of the left side of the chest was often sore. Other complaints were great exhaustion, trembling feelings, palpitations, dizziness, and headache. She had had much anxiety of late, her husband had been out of work for three years, and her children had been ill; she could not remember when she had last had a holiday—it was so long ago.

Examination.—A thin anxious woman, frequently taking deep sighing breaths, but breathing normally when her attention was distracted by questions. Nothing abnormal was found on clinical examination. Pulse 80, regular. Blood pressure 110/65. Urine normal. This patient was reassured and given a carminative; arrangements were made for a period of convalescence away from her family.

CASE 4.—A married woman, aged 30, had since July, 1932, been attending the out-patient department of the National Heart Hospital, suffering from mitral stenosis of moderate degree, together with auricular fibrillation. The heart condition remained satisfactory with regular digitalisation, and at no time had there been signs of congestive failure. At one attendance she complained that she "could not get a comfortable breath." If, however, she succeeded in yawning, she could then for a time breathe freely. Other complaints were irritability, feeling "very nervy," poor sleep, and getting easily exhausted.

On *examination* the cardiac condition was satisfactory and unchanged; there were no signs of congestive failure. The patient was reassured and a bromide mixture was prescribed.

ÆTIOLOGY

The cause of this disorder is obscure; it would seem to be in the nature of a spasm, limiting inspiration only and therefore the reverse of that observed in asthma. In this connexion it is interesting to note that Gallavardin,[7] commenting on this type of breathing, said that while screening a patient during an attack, there appeared to be a spasm of the diaphragm. Haldane, Meakins, and Priestley[8] while investigating the effect of shallow breathing found that it caused uneven ventilation of the lungs, and this in its turn produced anoxæmia and consequently periodic respiration. They further found that abdominal or thoracic constriction produced deepening of respiration; this suggests a possible association between the spasm of the diaphragm observed by Gallavardin and a restricted air entry which might automatically give rise to efforts to take deep breaths. More research will be necessary to determine whether these findings have a bearing on the ætiology of suspirious breathing.

DIAGNOSIS

The diagnosis is based chiefly on the character of the abnormal breathing as described by the patient and, if possible, as observed; a full deep inspiration achieved with effort, a slight pause followed by an easy expiration. The indefinite onset of the attacks unrelated to exertion, the absence of any change of colour, alteration in pulse-rate or blood pressure during an attack, the freedom from any physical signs, except in the few cases where there is associated organic disease, should give the clue. Added proof is obtained from the negative results from electrocardiographic, X ray, and other special examinations; and, in addition, there are the accompanying symptoms which are often multiple, and all of a nervous order and dependent on a lowered condition of general health.

In differential diagnosis it is clearly very important to distinguish this disorder from other causes of altered breathing, which may be dependent on an organic condition. There is also the possibility that incorrect diagnosis may lead to unnecessary treatment; a case of suspirious breathing diagnosed elsewhere as asthma was given a course of injections with, as might be expected, no beneficial results.

Many organic diseases give rise to attacks of dyspnœa as, for example, cardiac or uræmic asthma. Again, local obstruction may cause paroxysmal attacks of breathlessness, as with an intrathoracic goitre or a mass of glands in the mediastinum. The associated signs and symptoms of organic disease should prevent error in diagnosis, and a screening or a radiogram should reveal any local cause of obstruction. As Gallavardin[4] has pointed out, the clinical context and a precise description of the disorder make diagnosis simple.

PROGNOSIS

The prognosis as to life is good, since the condition is a benign one and of trivial significance. Once a patient has suffered from this disorder he or she will always be liable to a recurrence if overtired, upset, or in a lowered condition of health. The symptom is in the majority of cases occasional only or one lasting for short periods of time, but it should be remembered that it can persist for hours or even days with only brief intervals of relief, although any attack, however severe or prolonged, will spontaneously cease.

TREATMENT

It must be admitted that treatment is by no means always successful; each patient presents a separate problem and needs special consideration. Since the symptom is not imaginary it should not be treated as such.

As with all nervous disorders, reassurance both of the patient and her relatives plays a large part and, if accepted, will lead to the best results. The character of her distress should be explained to the patient; she should be told that it will in time disappear, and that she should, as far as she is able, disregard it. Inquiry should be made for any cause which may have led up to the condition, such as domestic worry, anxiety, mental strain, and this should if possible be remedied. An attempt should

be made to find out how the patient may subconsciously hope to benefit by ill-health or from whom she may seek sympathy. Any focus of infection should be attended to and any irregularity of daily life, such as excessive smoking, late hours, excessive eating or drinking, should be corrected. A holiday or a change of surroundings will in suitable cases be helpful. Of drugs, bromide and valerian, separately or together, with nux vomica are useful, and luminal has been given sometimes with success.

SUMMARY

1. A disorder of breathing is described which is so common as almost to have passed unnoticed in symptomatology. It affects patients without physical signs of disease and is generally associated with a group of symptoms expressive of physical or nervous exhaustion.

2. The disorder is frequently described by patients incorrectly as "breathlessness." The importance is shown of inquiring into the character of the breathlessness, as, if of the "suspirious" type, it will aid in assessing the part played by the nervous system in whatever condition may be found, particularly in those cases where it may happen to be associated with organic disease. If, however, the patient's statement is accepted without inquiry the resulting misinterpretation of the symptom will confuse the diagnosis.

3. Degrees in the severity of this symptom from an occasional forced sigh to an attack lasting for hours or even days are illustrated by four typical cases.

4. The ætiology is obscure, but it has been suggested that it is associated with a spasm of the diaphragm. In support is the fact that the end of each inspiration is achieved with effort as if against some obstruction, and further, that constriction of the thorax or the abdomen gives rise to deepening of respiration.

5. The absence of any organic basis for the disorder makes prognosis as to life good, but the symptom is often resistant to present forms of treatment and is liable to recur with recurrence of nervous stress or ill-health.

6. All the evidence points to this disorder being a nervous one, and in no circumstances an indication of cardiovascular disease.

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SCHOLARSHIP FOR CANCER RESEARCH.—The committee of the Cancer Hospital, Fulham-road, London, has awarded a scholarship of £100 per annum to Mrs. Boyland in recognition of her services in the research institute of the hospital. She has investigated with Mr. E. Boyland, Ph.D., the respiration of normal and cancerous tissues in the presence of derivatives of cancer-producing compounds, and will continue the development of this work. Previously she carried out research work at Cambridge and Heidelberg, and at the Royal Institution.

POST-OPERATIVE RESULTS IN THYROTOXICOSIS

BY MAURICE SILVERSTONE, M.B., Ch.M. Liverp., F.R.C.S. Eng.

RESIDENT SURGICAL OFFICER, ROYAL INFIRMARY, LIVERPOOL

THIS paper is based on records of 35 patients, who were either personally examined (22), or who replied to a series of questions (13). The number is small because the total number of patients (43) operated on during this time was small. This is probably because the patients only come to operation if their condition is grave—a supposition borne out by the relative preponderance of men. It is to be expected that the women are only operated on as a last resort, whereas economic conditions may send a male patient sooner to the surgeon. On the other hand, the cases may be few because of the general lack of patients with thyroid disorder in the district. For comparison, the number of cases of parenchymatous goitre and adenomata operated on during the same period was 177.

The follow-up was made at two intervals of time—in 1932 and 1933. The time given since operation is always the period between operation and the actual date of the patient's examination.

INFORMATION OBTAINED

Age and sex incidence.—There were 12 men and 23 women in the series. The proportion usually found is one man to five or ten women.[1] The age grouping showed 2 in the second decade, 15 in the third, 10 in the fourth, 4 in the fifth, and 4 in the sixth. The youngest was 19 and the eldest patient 55, the average age being 33½.

Precipitating factors.—In 6 patients there was a history of shock or emotional upset, to which the commencement of the illness was ascribed. Domestic worries were said to be causative in 1 case. The condition occurred after infectious illness in 2 cases. In 1 case there was a history of tooth extraction. One woman gave as precipitating cause the birth of a stillborn child, and another had a recurrence or relapse of symptoms following childbirth. Pregnancy or its results were found to be a factor in 2 out of 12 cases. Clarke and Black [2] found pregnancy to be the commonest precipitating cause in women in their series.

Duration of symptoms.—This was reckoned from the appearance of the first symptom to the time of operation, and was as follows. One patient had noticed the condition for a month, 7 gave a history of three to six months, 14 a history of seven months to a year, 5 from one to two years, 2 from two to three years, 3 from four to five years, and one case each seven years, nine years, and eighteen years.

Pre-operative treatment.—All the patients had direct pre-operative treatment, consisting of Lugol's iodine for ten days to two or three weeks in increasing minim doses, rest in bed, and in some cases quinine hydrobromide for two or three weeks.

In addition to this certain cases had remote pre-operative treatment, that is, an attempt had been made to deal with the condition by means other than surgery. Of these, 4 had had extensive medical treatment; 3 of them had had fairly long periods of rest in medical wards in an attempt to alleviate their trouble. Eight other cases had had X ray therapy, varying from one month to eighteen months. It was only on the failure of these treatments that

operation was decided on. Thus it is seen that one-third of the cases had had treatment other than surgical. It is obvious, of course, that the many more cases treated successfully by medical treatment or X ray therapy do not come within the purview of this paper. It may be, however, that surgery is too long refused these patients.

OPERATIVE TECHNIQUE

Intratracheal ether was the anæsthetic in 28 of the cases, open ether was used in 5, rectal ether in 1 case, and avertin in 1 case. Only in the latter 2 cases was the method of "stealing the thyroid" used. Premedication with morphia and atropine was used in all.

A subtotal thyroidectomy was performed on 25 cases. One was done eighteen years ago, and so the extent of the resection was probably not as great as practised by the same surgeon at present. This patient was advised to have further X ray treatment. One recurred and was cured by a second operation, and 1 is having further X ray therapy a year after operation.

The right lobe was removed in 3 cases, of which 1 relapsed and was cured by further removal of isthmus plus left lobe. (It is to be understood that in all these cases the posterior parts of each lobe are conserved for the better protection of the parathyroid bodies.) The left lobe was removed in 1 case, an adenoma was removed in another, and in 2 the right lobe plus half the left were resected; of these latter 1 was unsatisfactory. No difficulty was ever experienced in any of these cases which could be ascribed to preceding X ray therapy.

Mortality.—This has been reckoned on all the cases operated on to the end of 1932 whose records are accessible. There were 5 deaths amongst 62 cases operated on, i.e., a mortality-rate of 8 per cent. This is rather high. The deaths in 3 cases were due to pulmonary complications—death occurring four, twelve, and fifteen days respectively after operation—the type of operation being a subtotal thyroidectomy in 2 cases and resection of the right lobe in one. The other 2 deaths were due to post-operative collapse; 1 had a subtotal resection, and the other a resection of the left lobe only.

Pathology.—The microscopic pathology was reported on in 29 of the 35 cases. Of the 29 cases, 24 showed changes typical of exophthalmic goitre, in 2 there was evidence of slight hyperplasia, 2 showed adenomata with proliferation, and 1 was an adenoma. Thus, all but one patient had evidence of proliferation. This is in contradistinction to the group reported on by Clarke and Black,[1] when over a third of the cases examined were simple colloid adenomata, and a third showed some proliferative change.

Time following operation.—This group includes no case operated on after the end of 1931. The time elapsing between operation and the follow-up was: between one year and fifteen months, 9 cases; between sixteen and eighteen months, 4 cases; between nineteen months and two years, 13 cases; between two and three years, 3 cases; five to six years, 2 cases; and in 1 case each the time elapsed was eight and a half years, nine and a half years, eighteen years, and nineteen years.

SYMPTOMATIC END-RESULTS

Various symptoms were inquired into. As the patients had not been examined by me before the operation in the majority of instances, it was thought advisable not to go into detail as to the degree of any particular disability. In conditions such as exophthalmos and nervousness, the patient's view on the amelioration of the symptoms has been accepted. The presence of any symptoms mentioned in the case-sheet has been recorded as such without elaboration, as have been the findings obtained by me in those patients personally examined. Any disability is considered slight in the follow-up record if the condition has shown very considerable improvement or was in my opinion only slight.

Certain after-results have been grouped in Table I.

TABLE I.—AFTER-RESULTS OF THYROIDECTOMY

—	Pre-operative.				At follow-up.		
	Pres.	Sl.	Abs.	N.R.	Pres.	Sl.	Abs.
Tremors ..	28	0	2	5	2	11	22
Nervousness ..	31	0	0	4	4	14	17
Exophthalmos ..	28	0	6	1	6	15	14
Palpitation ..	28	1	1	5	7	7	21
Dyspnœa ..	18	0	5	12	11	4	20
Sweating ..	21	0	2	12	13	0	22

Pres. = present; Sl. = slight; Abs. = absent; N.R. = not recorded.

Pulse-rate.—The pulse-rates of patients on admission were as follows: under 90, five cases; between 91 and 100, five; between 111 and 120, fifteen; between 121 and 130, four; between 131 and 140, three; and between 141 and 150, three. Amongst these, there were two patients with auricular fibrillation, one of whom, however, had associated mitral stenosis. The average pulse-rate was 115. Usually the pulse-rate would diminish to the day of operation, following which there was a rise of 40–60 beats per minute, and then a subsidence. It would rise 10–20 beats per minute a day or two before discharge.

The lowest post-operative rates were grouped as follows: under 80, nine cases; between 81 and 90, fifteen cases; between 91 and 100, five cases; between 101 and 110, four cases; and two were not recorded. The average pulse-rate was 90. At the follow-up, of the twenty-two cases examined there were four under 70, five between 71 and 80, eleven between 81 and 90, and two between 111 and 120. The average pulse-rate was 81 or, if the latter two be excluded, 72 per minute.

TABLE II.—BLOOD PRESSURE RECORDS

Sex.	Age.	Years following operation.	Pulse on admission.	Pulse at follow-up.	B.P. on admission.	B.P. at follow-up.
M.	21	1	120	88	150/65	138/64
M.	25	1½	120	82	—	118/74
M.	26	2	96	64	—	132/88
F.	35	1½	100	88	—	160/94
M.	37	2	150	90	140/75	142/90
F.	37	2½	140	88	130/70	132/94
F.	30	1½	130	114	—	134/92
F.	24	9½	120	82	—	130/88
F.	22	5	120	68	—	118/98
F.	32	1½	110	84	—	140/86
M.	40	2½	90	75	126/60	144/94
F.	30	1½	130	76	130/75	110/90
M.	27	1½	110	84	—	120/80
F.	39	1½	90	80	110/65	112/82
F.	38	1½	120	88	134/70	128/108
M.	27	2	95	64	130/55	110/76
F.	46	1½	110	84	—	136/104
F.	24	1½	110	76	—	128/100
F.	54	2	98	60	140/80	108/90
F.	55	2	132	76	170/95	148/98
M.	45	1½	118	86	175/95	170/108
F.	22	1½	110	116	140/76	124/76

Blood pressure.—Clarke and Black [1] found that a few of their cases had a relatively high systolic and diastolic pressure following operation which could

not be accounted for completely by the difference in the years which had followed operation. Of the 22 cases in whom post-operative pressures were taken, 12 had had their blood pressures taken before operation during routine examination. The diastolic pressure was taken as the pressure at which sound becomes muffled rather than when it disappears. The post-operative pressures were taken by me, but not the pre-operative. It will be seen that the diastolic pressures at the follow-up were considerably higher; this may be apparent only because of the low diastolic pressures that patients with hyperthyroidism in the later stages tend to have, but in some cases they were higher than one would expect at their age (Table II.).

Weight.—Of the thirty-five cases, there was a definite loss of weight in nineteen; in three the weight had remained stationary, one was gaining weight—she was having medical treatment—and in twelve there was no record of loss or gain. In ten cases the amount of weight lost was recorded, and was as follows: two cases had lost a stone, one 1½ st., six had lost 2 st., and one 2½ st.

At the follow-up, thirty had gained weight, one has gained slightly, two had neither gained nor lost, and two had lost weight. Where known, the weight gained was 1 st. in three cases, 1½ st. in one case, 2 st. in eight cases, 2½ st. in one case, 3 st. in three cases, 4 st. in one case, and 5 st. in one case. The loss of weight was 1 st. in each of the two cases. One of these was a girl, otherwise fit, who returned to work a month after operation, and the other is the patient classed as unsatisfactory, who considers himself better but is symptomatically not cured. In none of the cases seen personally—amongst whom were the patients who had put on 3, 4, and 5 st.—was there any evidence of myxœdema; they had all lost 2 st. before operation.

Menses.—Excluding patients after the menopause, a record was made in sixteen cases. Amenorrhœa was present in eight patients for periods varying between 2 and 12 months, the average period being 7½ months. Of these, at the follow-up, the menses were regular in five, although one of these had had six months' amenorrhœa immediately after operation. One patient, aged 46, had menstruated once; another, aged 38, twice; and the menses in the third case were every four months.

Four patients before operation had menstruated every 2–3 months. The menses in these cases were all regular—every month—following operation. In four cases the menses were normal before operation. At the follow-up, one of the patients was pregnant; in another the menses were every seven weeks; in a third the menses lasted three days instead of six; and the fourth recorded no change.

Period of incapacity.—The patients were discharged from hospital on an average 12–14 days after operation. Occasionally they stayed up to three weeks. In order to compare the period of incapacity with the type of work, the patients were divided into three groups. In each group the period of incapacity considered is that at the end of which the patient went back to his full ordinary work.

The first group of 15 consists of people who were doing housework or had no definite occupation. Of these, 5 were back at full work in under a month, some of them in a week, and 2 took twelve months—the maximum time in the group—before they were fit. The average period in this group was three months.

The second group of 10 was of those following sedentary occupations—e.g., shop assistants, clerks, schoolmasters, dressmaker. Amongst these there were 4 who went back to full work in under two months and 1 took a year, the average disability period being four months.

In the third group, the period of incapacity and occupation were as follows: motor driver, six weeks; bus driver, three months; labourer, two years; and mechanic, two years (the 2 last are the ones considered as slightly improved by operation).

Of the remaining 6 cases, 2 went back to housework, time not being specified; one, a wardmaid, is having X ray therapy, and is considered a surgical failure; 2 are not back at work because of sleeplessness in the one case and "neuritis" in an arm in the other, and the third has no work to go to.

ASSESSMENT OF CURE

The assessment of cure is difficult. The enlargement of the thyroid is probably a part of a general dysfunction and, in operating on this, a break in a vicious circle may possibly be made. The patients usually have some residuum of symptoms; although they are fit to work there may be a little tremor or exophthalmos.

Don [3] considers the basal metabolic rate to be the only diagnostic test and its diminution the only criterion of cure. Clarke and Black [2] in their series point out that the pre-operative basal metabolic rate is variable, and in those cases who had two or more investigations the results differed considerably. They think that the loss or gain in weight is an important factor in the gravity and cure of the condition. Judd [4] also considers the loss in weight particularly important in the estimation of the toxicity. Clute and Veal [5] have found that the post-operative basal metabolic rate in their patients roughly parallels the pulse-rate, and agree that the loss in weight is proportional to the toxicity.

In the present series the patient's opinion is taken as to whether he is much improved or cured, except in that where this opinion—being favourable—is at variance with unfavourable post-operative symptoms, he is classed amongst the failures. On this basis 30 of the 35 cases were cured or much improved. A further two cases had to have a second operation, which cured them.

Of the latter, one was a male, aged 19, with one month's history, who had his right lobe only resected. He was better for some months, but relapsed. Further X ray therapy being a failure, he was operated on again two years later with resection of his left lobe and isthmus, being perfectly fit over a year after his operation.

The second case was a woman, aged 31, who had a subtotal thyroidectomy which cured her, but on pregnancy and labour supervening she had a recurrence of symptoms for which a second operation was done. Small remnants of thyroid were removed, and she considers herself cured 21 months after operation.

One patient with a subtotal resection, done 18 years ago, was cured by further X ray therapy, although his operation had given rise to considerable improvement. One patient who had had symptoms for 18 years before operation considered himself better, but symptomatically is not improved; and the last patient was not improved and is having X ray therapy 18 months after operation.

Thus a primary operation cured or improved 30 cases, and altogether 32 cases may be considered to have been improved by operation. Of the other 3 cases, 1 is a failure and 2 were slightly improved. This compares favourably with results previously published, which vary from 60 to 92 per cent. judged by consideration of the basal metabolic rate,[2 5 5 6] the weight and pulse,[4] or based on the patient's opinion.[7] Some observers have found myxœdema of varying degree after operation. Clarke and Black [2] even give it as their opinion that it is by the substitution of myxœdema for the original hyper-

thyroidism that the patients seem to be improved, and it is only when a happy balance is struck between these two that surgery can be said to have cured the hyperthyroidism. In this series I could find no clinical evidence of myœdema.

The scars in this series were usually inconspicuous, though in some there was slight adherence of the central portion or of the separate drainage wound, noticeable, if looked for, on deglutition. It is of interest that in four of the series there was palpable thyroid following subtotal resection. In three it took the form of small nodules, two of which were in the usual site of a thyroglossal cyst, just below the hyoid bone, and in the fourth there was a palpable left lobe. The latter case was operated on by a surgeon who does a rather less extensive resection. One of the four—with a small nodule—is the one symptomatically classed a failure; she is having further X ray therapy.

SUMMARY

1. The post-operative results of a series of 35 cases have been recorded.

2. Of these 30 were cured by primary operation, 2 more were cured by a second operation, 1 was a failure, 1 was cured by subsequent X ray therapy, and 1 was slightly improved by operation, having had no further treatment.

3. The mortality for the operation during this period was 8 per cent., the deaths being due either to chest complications or to collapse.

4. No cases of myxœdema were recognised clinically amongst the series.

I wish to thank the members of the honorary staff of the Royal Infirmary for permission to use their cases, and especially Prof. Kelly, who suggested the investigation.

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TREATMENT OF
MYASTHENIA GRAVIS WITH EPHEDRINE

BY DOUGLAS McALPINE, M.D. Glasg., F.R.C.P. Lond.

PHYSICIAN FOR NERVOUS DISEASES TO THE MIDDLESEX HOSPITAL, AND PHYSICIAN TO THE HOSPITAL FOR EPILEPSY AND PARALYSIS, MAIDA VALE, LONDON

RECENT investigations into myasthenia gravis have failed to throw much light on its causation. The balance of opinion seems to favour the view that it is due to disordered muscle metabolism. In considering treatment we are confronted with the same difficulty as in disseminated sclerosis—that is to say, the occurrence of natural remissions. In the past we have had to rely upon such drugs as strychnine and upon rest in bed, which is undoubtedly of benefit because it reduces claims upon muscle metabolism. Two facts have suggested that an endocrine factor may play a part, namely, the discovery of an enlarged thymus gland in about half the cases, and the improvement which not uncommonly takes place during pregnancy. On this basis preparations of thymus gland and ovarian and suprarenal extracts have been tried, but without any uniform results. During the past three years two new substances have been used in the treatment of myasthenia gravis: ephedrine and glycine. We owe the use of ephedrine in myasthenia gravis to Dr. Harriet Edgeworth,[1] herself a victim of the disease.

Her first symptoms began in 1918 in the form of marked fatigue. In 1924 she developed ptosis and diplopia. By 1926 she was bedridden and had great difficulty in chewing, swallowing, and talking. She remained in this condition for three years. She submitted to the fullest investigations but without any notable result. Five different preparations of suprarenal extract were found to be ineffectual. On two separate occasions she noted an improvement when taking ephedrine for other purposes. In 1929 she began to take this drug systematically, and arrived at an optimum dose of gr. ½ daily. Improvement rapidly followed its use. From being bedridden she is now able to live a normal but restricted life. She wrote an account of her case in 1930, and since then the value of ephedrine in the treatment of myasthenia gravis has been confirmed by a number of other workers chiefly in America.

Glycine, which is an amino-acid derivative, was first used in the treatment of the muscular dystrophies by Milhorrat, Technor, and Thomas.[2] They reported improvement in three cases. Boothby and others[3] in the Mayo Clinic, and Remen[4] in Germany, tried the effect of glycine in myasthenia gravis. Boothby, in December last, reported the result of treatment in eight cases. All showed improvement, but seven out of the eight cases were also given ephedrine. In one patient treated only with glycine marked improvement resulted. Another patient had glycine for two and a half months and improved; he was then given ephedrine in addition, and he showed further improvement. A third had been taking ephedrine for a year, but his condition was becoming worse; he also improved on glycine. The optimum dose of glycine seemed to be about 20 g. daily; ephedrine was given in doses of gr. ½ twice a day.

PERSONAL CASES

I have so far treated six cases of myasthenia gravis with ephedrine. In three there were natural remissions, and the part played by ephedrine was therefore impossible to gauge. In the remaining three cases definite improvement followed.

CASE 1.—A female, aged 24, was first seen at the Middlesex Hospital in June, 1929. Three months previously she had noticed drooping of both upper eyelids, and loss of power in both hands after she had used them for a short time. More recently she had had a tendency to choke at meals. There was no history of double vision.

She presented the typical facial expression of myasthenia gravis. There was a moderate degree of double ptosis, with a slight compensatory overaction of the frontalis muscles. The mouth was constantly open, and the patient was unable to whistle although she formerly could do so. There was definite weakness of the orbicularis oculi. Diplopia could easily be induced by asking the patient to turn the eyes repeatedly to one side or the other. Power in the upper limbs was slightly diminished and became quickly less after continued effort. The reflexes, superficial and deep, were normal.

She was admitted to hospital in July, 1929. For a month she was treated by complete rest and injections of strychnine, but she did not improve. She developed diplopia with a partial external ophthalmoplegia which has persisted since. In December, 1929, she contracted "influenza," for which she was confined to bed for about a week. On getting up she noticed weakness in the legs, with difficulty in masticating and swallowing. Her speech also became indistinct after talking for a minute or so.

She was readmitted to hospital early in February, 1931. The ptosis and weakness of the facial muscles was now more marked. Speech was dysarthric, and she had considerable difficulty in chewing and swallowing her food, especially towards the end of a meal. Power in the limbs was constantly reduced, and such simple operations as brushing and combing the hair tired her considerably. On Feb. 19th she was given ephedrine gr. 1 twice a day for two days. At the end of that period she volunteered the statement that chewing and swallowing had improved, and that her arms seemed stronger. Objectively the dysarthria was less marked. Within two or three days after stopping ephedrine she relapsed to her former state. As she was suffering from amenorrhœa 1 c.cm. of Progynon (ovarian extract) was given intramuscularly on alternate days. No improvement resulted. Ephedrine grs. 3 daily was then given, and again subjective and objective improvement was noted. This treatment was continued, and when she left hospital on April 16th she no longer had difficulty in chewing or swallowing, speech was more distinct, and ptosis less marked. Power in the arms was also improved, and she was able to be up in the ward for a couple of hours in the evening without undue fatigue. This treatment was continued under the supervision of Dr. E. C. Frend, of Hurstpierpoint. She was seen again on Sept. 14th. She had made still further improvement, especially in the distance she could walk. In December, 1931, ephedrine was stopped for two weeks. Within a few days she felt weaker, and she had to be assisted in dressing. Speech and swallowing also became more difficult. These symptoms again improved when she resumed ephedrine.

She was readmitted for observation in February, 1932. The ptosis and weakness of the facial muscles remained as before and she still showed a partial external ophthalmoplegia with diplopia. Speech was no longer dysarthric, and she could swallow solid food with only occasional difficulty. She still showed slight fatigue on masticating towards the end of a meal. As she had lost about a stone and a half in weight in the previous two years it was decided to try the effect of 15 units of insulin daily with glucose. Ephedrine was stopped. This treatment had to be terminated at the end of a week because of the exacerbation of all her symptoms. Ephedrine was given once more, and again she slowly improved. She has used this drug continuously since.

When seen in April, 1933, she stated that swallowing was quite satisfactory till tea-time, but she usually had some difficulty with the evening meal. Drooping of the eyelids still worried her, as well as double vision. An attempt was made to reduce the amount of ephedrine to gr. ½ twice a day. Dr. Frend found, however, that the symptoms became worse, so the former dose of grs. 3 a day has had to be resumed.

CASE 2.—A female, aged 36, employed as a domestic servant, first noticed in the spring of 1930 undue fatigue in the arms after working, followed by drooping of the right upper eyelid. When seen at the Middlesex Hospital on June 26th, 1933, examination of the nervous system was negative, apart from slight right-sided ptosis. A tentative diagnosis of myasthenia gravis was made. She was admitted to the neurological ward of the Middlesex Hospital in July, 1930. For a fortnight before admission she had been troubled with double vision.

Ocular movements were full, but diplopia could be easily induced. There was variable right-sided ptosis which was more marked towards the evening. The frontalis and orbicularis oculi muscles were bilaterally weak. There was no dysarthria or dysphagia. Power in the arms was slightly diminished, but there was no atrophy, and the reflexes were normal. A fortnight after admission diplopia became constant, despite rest in bed. She was given a mixture containing strychnine and iron, and was discharged, appreciably improved, at the end of July, 1930, to a convalescent home. She was seen again in November of the same year, when she complained of weakness of both legs after walking a short distance, and of drooping of both eyelids at night with persistent diplopia. By the middle of January, 1931, her arms had become so weak that she had been compelled to stop work.

She was readmitted on Jan. 22nd, 1931. In addition to the signs previously noted there was now impairment of all movements of the left eye and power in both upper and lower limbs was reduced. She was unable to knit for more than a few minutes owing to fatigue in the fingers of both hands. Although there was no evidence of enlargement of the thymus gland either by percussion of radioscopy, she was given an exposure of deep X rays to the anterior mediastinum on four occasions without any obvious benefit. On April 1st she complained of slight difficulty in swallowing and regurgitation of fluids through her nose; these symptoms continued, especially with the evening meal. She was then given ephedrine gr. ½ thrice daily. Slight but definite improvement in the symptoms was noted within a week. On two occasions ephedrine was stopped, and the patient complained that she did not feel so well. For the past two years she has taken the same dose of ephedrine and has been able to continue work during this period. However, she can only walk for about ten minutes before fatigue in her legs compels her to sit down. On one occasion she did not take the ephedrine for two days. "All my strength seemed to go, and I was compelled to go to bed." On May 4th, 1933, she reported that for the past three months double vision, which disappeared towards the end of 1931, was again troubling her, and that lately the left eyelid had drooped towards evening. She reported on May 18th that she felt better, and she has since resumed her work.

CASE 3.—A male, aged 61, was admitted to the neurological ward of the Middlesex Hospital on March 11th, 1933, on account of inability to swallow. In September, 1932, he had noticed drooping of the right eyelid, which lasted for about three weeks. During this time his jaws tired towards the end of a meal, and his speech became "thick" after he had talked too much. He was able to continue with his work of a bricklayer until March 4th, 1933, when he had difficulty in swallowing his evening meal. This difficulty was more marked on the following day, and for four days before admission he had been unable to swallow even liquids. He stated that he had lost a stone in weight in the past six months.

He looked anxious and ill. His speech had a nasal quality and was so dysarthric that it was difficult to understand what he said. The pupils reacted normally. There was slight right-sided ptosis but no diplopia, and ocular movements were full. The upper facial muscles were unaffected except for slight weakness of the orbicularis oculi. The circumoral muscles were weak, the mouth being kept constantly open; he was unable to whistle. The palate moved well on phonation. He was given some thick soup, but this he was quite unable to swallow, some of it being regurgitated through his nose. Although he had difficulty in keeping the tongue protruded it was not wasted. Power in all four limbs was good; there was no wasting and the reflexes were normal.

He was given ephedrine gr. ½ thrice daily subcutaneously. At the end of 48 hours he was able to swallow fluids with difficulty. Ephedrine was continued for another five days, with further improvement in swallowing and speech. It was then stopped and he was given 20 g. of glycine daily by the mouth, and two days later the dose was doubled. After four days of this treatment his condition was as bad as on admission, and he now complained of weakness of his right arm. Glycine was therefore stopped and ephedrine resumed, with rapid relief of the symptoms. Within a fortnight he was able to swallow minced meat, and he no longer regurgitated liquids through his nose. His speech was practically normal, and he could read aloud for two minutes without fatigue. The weakness of the right arm also cleared up. On April 22nd, in addition to ephedrine, he was given 20 g. of glycine, and two days later ephedrine was stopped, although we continued to give him a similar tablet containing saccharin. Within 48 hours he complained of difficulty in swallowing, as well as regurgitation of fluids through the nose. On May 1st ephedrine was resumed, and again improvement followed. Myographic tracings taken at various stages of treatment indicated a progressive improvement as a result of treatment with ephedrine. On his discharge on May 28th he had put on over a stone in weight, his speech was normal, and he was able to swallow minced

meat. He continued to take gr. ½ of ephedrine twice daily, and the improvement was maintained for two weeks. Dysphagia and dysarthria again became troublesome.

He was readmitted on June 20th. Ephedrine in doses of gr. ½ twice and later three times a day was given orally, and later subcutaneously when swallowing became impossible. Glycine in doses of 20 g. daily was also given both by the mouth and rectum. Despite this treatment his condition quickly grew worse, swallowing became impossible, and rectal feeding became necessary. His speech was quite inarticulate; he developed weakness of all the facial muscles, and his lower jaw dropped. His head had to be supported and he was unable to raise his arms. He had attacks of dyspnœa, and finally one of these proved fatal on July 8th.

CONCLUSIONS

It is difficult to assess the real value of any line of treatment in diseases in which there may be natural remissions; but in these three cases definite improvement, both subjective and objective, followed the use of ephedrine. On the other hand, in Case 3, the disease progressed rapidly to a fatal termination after a temporary improvement.

Dr. Edgeworth found in her own case that the optimum dose of ephedrine was gr. ⅝ daily. If, however, any extra exertion is required of her she takes an additional gr. ¾. No larger dose than gr. ½ twice a day should be necessary for routine purposes. In Case 1 grs. 3 was given daily for over two years before an attempt was made to reduce the dose. With smaller doses her condition became worse, and the former dose had to be resumed. Although in this case the only untoward result of this large dose has been a rise in her blood pressure to 140/100, care should be taken never to exceed grs. 1½ daily. Larger doses do not cause a correspondingly greater improvement, and their effects may be deleterious, as Dr. Edgeworth has pointed out.

In Case 3 glycine failed to reduce the acute bulbar symptoms even in doses of 40 g. daily. Myographic tracings in this case seem to show, however, a better effect when the patient was taking both glycine and ephedrine than when he was taking ephedrine alone. From the experience of Boothby in the Mayo Clinic it seems likely that the simultaneous use of these drugs is desirable. The rationale for the use of these substances can be based on the following facts.

Orbelli,[5] using an excised muscle preparation, has shown that stimulation of the sympathetic nerve-endings diminished fatigue, the maximum effect being reached some time after sympathetic stimulation has ceased. Further, it has been shown by Canon and Nice [6] and others that adrenaline diminishes muscular fatigue. Ephedrine in its action closely resembles adrenaline, but its effects are more prolonged. One of its actions is to stimulate sympathetic nerve-endings in muscle, and to this property may be attributed the benefit that may follow its use in myasthenia gravis. With regard to glycine, Abderhalden and Gellhorn [7] were able to prove that the action of adrenaline on the smooth muscle of the frog was intensified by the addition of an amino-acid. Theoretically therefore there is a sound basis for the combined use of an amino-acid, such as glycine, and ephedrine in the treatment of myasthenia gravis. A drawback to the use of glycine is its present high cost. In collaboration with Prof. E. C. Dodds I am trying the effects of other amino-acids in association with ephedrine as opportunities occur.

EPHEDRINE IN DIAGNOSIS

Dr. Edgeworth commented on the use of ephedrine as a therapeutic test in the diagnosis of early cases of myasthenia gravis, especially those in which excessive fatigability forms the only symptom. The possibility of early myasthenia gravis must be borne in mind in such cases, and if improvement follows the use of ephedrine then the case should be considered as possibly one of myasthenia gravis. Especially difficult from the diagnostic point of view are those cases in which undue fatigue is confined to one limb, usually the arm. In others an aching sensation amounting to pain, aggravated by use, is sometimes complained of round the shoulders and in the neck muscles, and such cases may be labelled as fibrositis, especially as these symptoms may be worse in cold weather. Again, when the muscles supplied by the brain-stem are involved, difficulties in diagnosis may arise both in those cases where the paralysis varies little or not at all or in cases in which there is an acute onset of marked ocular or bulbar paralysis. I have recently seen two such cases in consultation with Dr. E. V. Slaughter, the one showing a constant double external ophthalmoplegia with variable ptosis, but no other signs; and the other, acute bulbar symptoms. Both complained of easily induced fatigue. Although a diagnosis of myasthenia gravis was highly probable in each case, it became more certain when, after a few days' treatment with ephedrine, the general fatigue diminished. The patient with chronic ophthalmoplegia after a week's treatment volunteered that she did not feel "half as tired." In the other case the bulbar symptoms and fatigue rapidly improved.

SUMMARY

(1) Ephedrine in doses of gr. ½ twice daily is of distinct value in the treatment of myasthenia gravis; the disease may, however, progress during its use. (2) On theoretical grounds the action of ephedrine should be reinforced by an amino-acid such as glycine.* This combination merits a clinical trial.

I am indebted to Dr. F. Golla for the reference to the work of Abderhalden and Gellhorn.

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THE BLOOD COUNT IN RUBELLA

WITH SPECIAL REFERENCE TO PLASMA CELLS AND TÜRK CELLS

By John Vincent Carroll, M.D. Dub., D.P.H.

ASSISTANT MEDICAL OFFICER, L.C.C., PARK HOSPITAL, HITHER GREEN

The plasma cell is a cell with abundant basophil cytoplasm, with a nucleus generally somewhat eccentric, which has its basichromatin concentrated to form large masses, and has a clear space to one side. If, however, a cell with basophil and vacuolated cytoplasm shows: (1) a nucleus which is roughly round or oval and definitely eccentric; (2) basichromatin radially arranged, forming triangular masses where it comes into contact with the nuclear membrane; (3) a clear space or *Zellhof* at that side of the nucleus near the centre of the cell; and (4) a cell outline which is round or oval with a smooth edge, it may be looked upon as a typical Marschalko plasma cell.

* Gelatin contains approximately 25 per cent. of glycine. A daily dose of 80 g., boiled down into a jelly, has proved to be a simple and inexpensive method of administering glycine.

The Türk "irritation" cell (the *Reizungszellen* of Pappenheim) morphologically comes between the plasma cell and the lymphocyte. Indeed at times it is very difficult to classify a certain cell as a plasma cell, Türk cell, or basophil lymphocyte, especially if the nucleus is of the younger type or if the cells under observation are undergoing pyknosis, as is so often seen, chiefly in measles but also at times in rubella. The Türk cell is about the same size or slightly larger than the lymphocyte. The nucleus is generally slightly eccentric, and the basichromatin and oxychromatin masses are more distinctly separated than in the lymphocyte. At times the basichromatin may become somewhat radially placed. The Türk cell shows no clear zone to the side of the nucleus, nor is the cytoplasm vacuolated. The cytoplasm, however, takes up the basic stains very readily and more evenly than the plasma cell, so a more homogenous cytoplasm is seen than the characteristic foamy cytoplasm of the plasma cell.

Piney [2] says: "There seems to be no doubt that the Türk cell is a modified lymphocyte, but whether it is a stage in the development of the plasma cell is still not quite certain." Ghon and Roman [3] write that Pappenheim held that the inflammatory cells of Türk (*Reizungszellen*) which on occasion appear in the blood are plasma cells.

In children the monocytes are normally about 15 per cent. and the lymphocytes may be 50 per cent. of the white cells at four years of age. The blood count given in the accompanying Table is taken from a case of rubella and shows a post-infective leucocytosis (300 cells counted).

—	1st–3rd day.	3rd–4th day.	5th–6th day.	About 8th day.
	Per cent.			
Plasma cells	1	7	1	1
Türk cells	1	3	Nil.	Nil.
Neutrophils	63	44	50	66
Young forms	Nil.	Nil.	Nil.	Nil.
Eosinophils	1	5	2	1
Basophils	Nil.	Nil.	Nil.	Nil.
Myelocytes				
Lymphocytes	22 (S. 19, L. 3)	28 (S. 23, L. 5)	30 (S. 23, L. 7)	17 (S. 12, L. 5)
Monocytes	12	13	17	15

It occurs early (on the fifth or sixth day), and denotes recovery. There is an increase of the eosinophils on the third to the fourth day, just as is said to occur in scarlet fever. But this case shows that eosinophilia is not confined to scarlet fever. The rise of the polymorphs can be seen at the end of the week. The monocytes show the usual high percentage. The characteristic fall of the neutrophils can be seen between the third and sixth days.

THIRTY CASES OF RUBELLA

I found plasma cells in all of 30 cases of rubella, whether relatively severe or very mild. That these cells appeared very early in the disease, in the usual proportion of about 2 per cent. and presumably before the rash, is worthy of note. Indeed it may not be wrong to infer that they appear when the glands enlarge—usually a few days before the rash comes out. This may be of importance in preventive medicine in epidemics where cases could be isolated at the earliest opportunity.

The plasma cells were chiefly of the Marschalko type and increased generally up to the third day to about 3 to 11 per cent., by which time they reached their greatest numbers in the blood. From this day they gradually declined, until by the end of the second week they had to all intents and purposes disappeared, although in one or two cases delayed in hospital I noticed a lone plasma cell or two even as late as the end of the third week.

Türk cells were often present, but were not so constant in their appearance or so high in numbers as the plasma cells. At times they were absent. I have also seen a few cells which I diagnosed as lymphoblasts. Indeed, a complete gradation of cells from the lymphoblast to the lymphocyte was seen, with plasma cells, Türk cells, and basophilic lymphocytes marking the intermediate stages. The polymorphonuclear neutrophil leucocytes do not seem to be much affected beyond a moderate reduction in number from the third or fourth day to about the sixth or seventh. A leucopenia was noticed on the first day, when the rash was present, as in measles. I also found that, at times, there was a definite increase in the eosinophils, especially on the third to the fifth day, as is often seen in scarlet fever.

The lymphocytes are increased in numbers, sometimes markedly so, especially from about the fourth or fifth day onwards when the patient is recovering; this post-infective lymphocytosis is very constant and is usually well marked. At times the lymphocytes become basophil. The monocytes are also increased, and at times the curve of their rise and fall runs parallel with that of the lymphocytes. Again, some are more basophil than normally. No myelocytes were seen.

MEASLES CASES

I also found plasma cells and Türk cells in measles and, to what appeared at casual examinations, in no small proportion. Piney [4] states that Türk cells are not uncommon in measles. Having discovered this I determined to examine the blood of 25 cases of measles in detail, to see if a differential diagnosis could be made by blood examination between rubella and measles.

The following is a representative blood count from a case of measles when the rash is present (300 cells counted):—

	Per cent.		Per cent.
Plasma cells	2	Myelocytes	Nil
Türk cells	2	Lymphocytes	36
Neutrophils	49	Small 32 per cent.	
Young forms	Nil	Large 4 per cent.	
Eosinophils	2·5	Monocytes	10
Basophils	Nil		

The plasma cells in this case were not of the typical Marschalko type, with the exception of one cell. They had the appearance of immature basophil lymphocytes; still, I could not classify them otherwise than as plasma cells. The Türk cells did not look so typical or so distinct as those of rubella.

The lymphocytes were well increased and many were basophil. About 2 per cent. resembled lymphoblasts, having nucleoli and a finely stippled nucleus with basichromatin nuclear membrane. The monocytes were also increased; about 2 per cent. were basophil, and some contained nucleoli. The polymorphs were diminished in numbers.

To summarise, I found plasma cells and Türk cells in measles, but not so constantly as in rubella. The average percentage of plasma cells was not so high as in rubella. Indeed, in not a few cases plasma cells or Türk cells were absent, and in some cases both were not found. The typical Marschalko plasma cells were not usually present, and at times the Türk cells were atypical. Of course the predominant pyknosis and basophilia, which I found in measles, made the differentiation somewhat difficult. In short, measles seems to show an earlier variety, in the genetic scale of cells, than rubella. At times I saw

cells which had the morphology of lymphoblasts in the proportion of about 1 per cent. of the lymphocytes. Again, the Türk cells had a younger appearance: the cytoplasm was vacuolated at times, not in a foamy way, but with a few clear, well-defined vacuoles. Sometimes the nucleus became paler than normal and was slightly stippled.

The lymphocytes showed much basophilia, and at times were greatly increased, even up to 42 per cent. The monocytes were also inclined to be basophil, and were often increased in numbers: one case showed 30 per cent. They assumed at times an early form which resembled promonocytes. Between this very early form and the ordinary monocyte I saw intermediate stages which resembled monocytic plasma cells. However, the intense basophilia and the marked pyknosis hindered me from making a definite diagnosis. A few myelocytes and young forms of neutrophils were seen. Eosinopenia was commonly found.

I got a general impression of disorder and confusion in the blood of measles as regards morphology, size, and staining. I agree with Hickling [5] when he states that there is an eosinopenia in measles, but I cannot always agree that there is an eosinopenia in rubella. (This may vary with the epidemic.) We also agree about the toxic changes in measles, and that plasma cells and Türk cells are seen in measles, but with less regularity than in rubella. Hickling in the same paper says that he found plasma cells in scarlet fever, but in my series of about 25 cases I was unable to see any plasma cells or Türk cells. However, on looking at his differential counts I saw that he found them (out of seven cases reported) only in three cases in the proportion of 0·2 per cent., 0·5 per cent., and 1·4 per cent., which is practically negligible.

OTHER INFECTIOUS DISEASES

I next examined blood from cases of scarlet fever, whooping-cough, serum rashes, anomalous rashes, and normal blood; but I found no plasma cells, or very few (for all practical purposes none), in the slides.

In the series of 25 cases of *scarlet fever* which I examined I did not see any plasma cells. Indeed, the chief characteristic which I noted was a leucocytosis, but I saw a moderate eosinophilia only at times. I was surprised at the scarcity of the eosinophils, as it is stated in various works that eosinophilia is very characteristic if not pathognomonic of scarlet fever. I also saw in many of the polymorphonuclear neutrophils what are called Döhle's inclusion bodies, or Amato's bodies. These are round or slightly oval bodies found in the cytoplasm; they stain—but not too well—a faint, hazy, dark bluish tint. I also found that the lymphocytes were diminished. Leoni's findings [6] closely agree with mine. These findings may be peculiar to the scarlet fever of particular epidemics, or may be in keeping with the modern and milder form of scarlet fever.

I also examined the blood in some 25 cases of *whooping-cough*, and was struck with the large percentage of lymphocytes. Basophilia of the lymphocytes was very characteristic. In about 20 per cent. I found a few plasma cells, but not in sufficient numbers to cause difficulty in diagnosis. The monocytes were also increased. In cases which developed septic broncho-pneumonia, the polymorphonuclear neutrophils became generally increased in number.

I also examined a series of cases comprised of normal blood-serum *rashes*, various rashes of unknown etiology, and rashes probably due to drugs, food, or enemata, not forgetting chicken-pox, as the prodromal rash of this disease may resemble rubella or scarlet fever, but I did not find plasma cells or Türk cells. Piney [1] states that even in normal blood very few plasma cells may be found, so the finding of an odd plasma cell in any blood, no matter from what cause, need not be a signal for lowering the value of the diagnostic significance of the plasma cell found chiefly in rubella.

Lastly, I had an opportunity of examining about 25 slides of the mild—some very mild—cases of *small-pox* prevalent in London in July, 1931, and in almost every case I found about 1 or 2 per cent. plasma cells during the vesicular and pustular stage of the rash.

In conclusion, I claim that the diagnosis of rubella can be helped to a very large extent by the finding of plasma cells and Türk cells in the blood. However, since they are also found in the blood of measles a definite diagnosis is very improbable.

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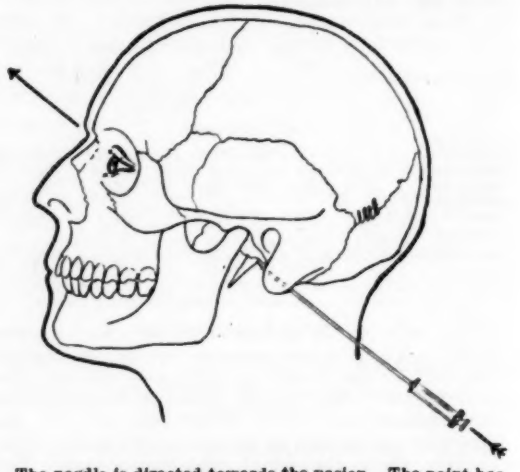
A METHOD OF INJECTION OF THE FACIAL NERVE

By James Whillis, M.D., M.S. Durh., F.R.C.S. Eng.
LECTURER IN ANATOMY IN THE UNIVERSITY OF DURHAM

Occasionally it is necessary as a therapeutic measure to inject the facial nerve with alcohol. The route usually chosen, that through the parotid region, has disadvantages. In any but the most expert hands the method is uncertain as the bony guides are few and success depends on measurement. In addition, the parotid region contains large vessels which may be damaged.



The needle is directed towards the nasion. The point has reached the base of the styloid process.

The method to be described aims at injection of the trunk of the nerve just as it leaves the stylomastoid foramen.

After preliminary infiltration of the skin with novocain the needle is entered just behind and about one-quarter to one-eighth of an inch above the tip of the mastoid process of the temporal bone. A few minims of novocain are injected and the needle pushed on in close contact with the deep surface of the mastoid. The point to be aimed at in both upward and inward directions is the nasion. Having reached a depth varying between an inch and an inch and a quarter the needle point will be felt to strike the base of the styloid process. The needle is now withdrawn slightly and the point tilted upwards

so as to engage in the stylomastoid foramen. When this has been reached fairly severe facial spasms usually occur. The immediate abolition of these spasms by the injection of a few minims of novocain gives a dramatic indication that the nerve has been reached. Another syringe containing alcohol is attached and a small quantity injected into the nerve.

It is important in carrying out this method to aim exactly for the nasion, as if the needle pass too far medially it misses the styloid and may enter the internal jugular vein. It is safer before making any injection to make sure that this has not happened by attaching an empty syringe to the needle and aspirating gently.

The method described above has been tried out extensively in the cadaver, and during the last few months has been used by Dr. F. J. Nattrass, of Newcastle-on-Tyne, for the treatment of several cases of intractable facial tic. In all cases the nerve was successfully paralysed, the operation being carried out without difficulty in a few minutes.

CARCINOMA OF THE BLADDER WITH INTRAPERITONEAL PERFORATION

By Dillwyn Evans, M.B., B.Sc. Wales

HOUSE SURGEON TO THE SURGICAL UNIT, WELSH NATIONAL SCHOOL OF MEDICINE, THE ROYAL INFIRMARY, CARDIFF

Of the many causes of intraperitoneal rupture of the bladder, carcinoma is one of the rarer and may cause a certain amount of difficulty in diagnosis. The following case is an example of carcinomatous ulceration of the bladder eroding into the peritoneal cavity.

A married man, aged 53, was admitted to the Surgical Unit of the Cardiff Royal Infirmary as an emergency on Oct. 11th, 1933. For four months before admission he had suffered from frequent attacks of hæmaturia, and for the past two months had had severe suprapubic pain following micturition. This pain had become so severe that he now refrained from passing urine as long as possible. For a week he had been confined to bed and had complained of a severe pain arising in the right loin and shooting downwards to the right groin. This pain had been considerably relieved by heat and morphia. For two days before admission he had passed only 1 oz. of urine. There was nothing else of note in the previous history.

His temperature was 96·2° F., the pulse-rate 96 and feeble, and the respirations 24. He had obviously lost weight; his eyes were sunken and his arteries prominent, thickened, and tortuous. He was suffering from considerable suprapubic pain. His abdomen moved with respiration and was not rigid. There was tenderness in the right loin and hypogastrium, but nothing more was discovered.

Two hours later he was seen again and it was immediately obvious that some great change had taken place in his condition. Abdominal pain was now diffuse and intense, being most severe on the right side—radiating downwards and forwards from the loin to the groin. The patient was very restless; his face was drawn and anxious; he was perspiring freely and his respirations were rapid, shallow, and costal in type. There was generalised abdominal rigidity, most marked on the right side. The right testicle was retracted up to the external abdominal ring. The patient insisted that he had had pain almost as severe for the past eight days and that it was this shooting pain from right loin to groin which distressed him most.

An X ray photograph of the abdomen did not reveal a calculus in the urinary tract.

Later he began to vomit. A diagnosis of intraperitoneal perforation of the bladder was made, but as the patient was now almost moribund, radical treatment was considered to be out of the question. A catheter was then passed and 3 oz. of urine withdrawn. It was acid in reaction, of specific gravity 1040, and contained blood and albumin. The blood contained 94 mg. of urea per 100 c.cm. The temperature, which from his admission had been only 96·2° F., remained below normal; the pulse-rate rose to 144 and the respirations to 32, and he became semi-comatose and died.

A necropsy showed an extensive carcinomatous growth on the upper surface of the bladder extending more to the right than the left of the midline and involving about half of the bladder wall but leaving the right ureter free. This growth had given way near its centre producing a perforation into the peritoneal cavity. The perforation measured approximately half an inch in diameter. No metastases were found in the lymph glands. The right ureter was slightly dilated but the kidneys were normal. The peritoneal cavity contained a large quantity of urine and there was an early diffuse peritonitis.

I am indebted to Prof. A. W. Sheen, the director, and the members of the Surgical Unit staff, for permission to record this case.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF RADIOLOGY

At a meeting of this section held on Jan. 19th the chair was taken by Mr. R. S. Paterson, the president, and Dr. Douglas Webster opened a discussion on the

Protracted Fractional X Ray Method (Coutard)

in the treatment of cancer of the larynx. This disease, he said, presented highly specialised biological and technical problems, and a study of 42 cases treated by X rays had shown him that it was rarely amenable to methods which were often successful in other parts. All forms of mild dosage and of massive dosage delivered within a few days had failed. There was, however, no doubt of the value of X rays, and highly fractional dosage with very large total intensity had been more successful. He urged his colleagues to analyse their results critically, with a view to abandoning some techniques and confirming others, and he related his experience with various methods. Nearly half his cases had been inoperable, and most of them had suffered from extrinsic cancer. The usual cross-fire method delivered a double dose just where the thyroid cartilage was most sensitive, and was apt to cause necrosis. In Finzi's method six fields were taken and the whole dose was given in about a fortnight; Dr. Webster, however, regarded the total dose in the larynx (240 per cent.) as wholly inadequate. He had then tried Holfelder's method and had finally adopted Coutard's on two cases, both of which had done very well so far. The aim of the technique was to deliver a maximal dose to the malignant tissues with conservation of the normal tissues. It was a highly fractional method; the minute intensity was about 3 r and the total intensity 6000–10,000 r, spread over two or three weeks. Each patient treated by Coutard's method required as much time and energy as 20 treated by other methods. The dosage was controlled by H

and r units and by daily laryngoscopic observation of the mucosal and skin reactions. Two or more lateral fields were irradiated through a filtration of 2 mm. of copper or zinc. It was essential to vary the time and dose to suit individual cases. The biological basis of the technique was the experimental work of Regaud on testicular germinal layers. The lowering of the r-per-minute intensity had greatly increased the possible total dose. The method was valuable in primary cases, as a post-operative technique in early cases, and after growth and cartilage removal in more advanced cases to avoid cartilage necrosis. If the treatment period was too short the mucosal reaction was too great and prolonged, and overlapped a bad skin reaction. If the treatment time were too prolonged the reaction might be inadequate. Coutard's results showed 27 per cent. surviving for seven years. Most of his cases had been very advanced. No other treatment was likely to give such results. The chief criticisms related to the time and expense; the hospital cost had been calculated in Switzerland at £60 per patient. Holfelder in recent years had treated 61 cases, and over half of them had been free from recurrence for two years or more; he (Holfelder) did not think that Coutard's method gave better results. Holfelder's was certainly the only alternative to Coutard's method, but Coutard's was the method of election.

A LARYNGOLOGIST'S EXPERIENCE

Mr. DOUGLAS HARMER said he had no personal knowledge of Coutard's method. He had traced 178 cases treated during recent years at St. Bartholomew's or Mount Vernon, excluding all those treated with radium. The cases had been bad inoperable ones and the treatment had been given with a view to palliation only. Of these 130 were dead and only 8 were free from disease; the longest disease-free period was three years. The results would have been twice as good for extrinsic and five times as good for intrinsic cancer if radium had been included. The figures did not compare with Coutard's. The statement that laryngeal cancer was not controllable by methods successful in other sites was true only of inoperable cases. Nearly all laryngeal growths seemed to be radiosensitive, but there was more improvement in the primary than in the secondary lesions. As the primary growth shrivelled the symptoms diminished. Sometimes the patient even seemed to be cured, but after the reactions had subsided signs of persistence could be found. A second course of X rays might then be given; small and localised lesions could often be destroyed by diathermy; or radium needles or seeds might be inserted in certain cases, though necrosis was apt to follow. Shrunken fibrosed glands might remain quiescent for large periods. X rays doubled the survival period in two-thirds of the cases and the final stages were then extremely rapid. Results had improved since higher currents had been employed; the dangers had been over-estimated. It was better to burn the skin than to fail to deliver an adequate dose. The lower-grade tumours responded slowly and were often arrested for considerable periods. X rays were still the best treatment for truly inoperable growth, but in early cases a combination of surgery, X rays, and radium was greatly to be preferred. The importance of pre- and post-operative X rays had not been fully realised. The intrinsic forms were more sensitive than the extrinsic to X rays; in doubtful cases post-operative irradiation would probably improve the prognosis, and in late cases X rays were the best treatment.

DISCUSSION

Dr. N. S. FINZI described his modifications of his original technique. He now spread the treatment over 18 or 24 doses and four to six weeks if possible. This improved the results and decreased discomfort. The critical question was one of actual dosage on the tumour rather than of r per minute. The value of fractionating the dose was undoubted. There must be a severe skin and very severe mucosal reaction; many failures and recurrences were due to insufficient dosage. Equally good results with less discomfort might be anticipated from pushing up the dosage with the six-field method.

Prof. J. M. WOODBURN MORISON thought that Dr. Webster's case for the Coutard treatment was almost unanswerable; the method had a definite biological basis and showed results. Not all the malignant cells would be caught by any one treatment. The Coutard technique, however, was not ideal because of the severe reaction. It was interesting to compare it with treatment by the 1 g. radium bomb, which also gave an intensity of 3 r per minute in protracted dosage. The skin reaction was alarming at first, but in the end quite a good skin resulted.

Sir JAMES DUNDAS-GRANT described a case successfully treated by the late Dr. R. Knox, and another case successfully treated by Coutard's method. He had heard recently from an old patient whose epithelioma he had removed 20 years ago, and still felt there was much to be said for laryngo-fissure. When radiation treatment succeeded, however, its results were impressive. He asked whether the staphylococcus played a part in the radio-dermatitis.

Dr. W. M. LEVITT deprecated confusion of the field arrangement with the time-intensity radiation. He regarded Coutard's field arrangement as inferior to Finzi's. The fields adopted depended on the view taken of the growth as a whole. The growth should be attacked as one with extensive glandular connexions and the whole neck must therefore be irradiated. Results had undoubtedly improved since the duration of treatment had increased. The superiority of Coutard's results was partly due to the larger dose he gave. There was nothing in the r per minute difference. Holfelder's time-relations agreed extraordinarily well with those published by Dr. Finzi and himself. Result statistics were affected by the classification of growths adopted.

Mr. C. A. B. HORSFORD gave further details of one of the cases mentioned by Dr. Webster. It was important, he said, to remove every trace of visible disease at operation. He asked whether the intralaryngeal reaction would be as intense if there were no disease left when post-operative X rays were given. He quoted another case in which the whole growth had certainly not been removed, but there had been no recurrence in eight years after a post-operative dose of X rays.

Dr. F. HERNAMAN-JOHNSON asked if all cases treated should be in hospital the whole time; whether lanolin on the skin before exposure modified the reaction; and also for information about very large doses given in two or three minutes. In practically every form of growth where X rays were any use at all a pre-operative dose ought to be given.

Dr. WEBSTER, in reply, emphasised the fact that only high doses did any good. He thought it unnecessary to treat the posterior half of the neck as Finzi's method did. The protracted dose had very much less effect on the lung, kidney, and circulatory system.

SECTION OF MEDICINE

AT a meeting of this section held on Jan. 23rd, the chair was taken by Dr. MORLEY FLETCHER, vice-president, and Prof. E. RIST, of Paris, opened a discussion on the

Present Position of Collapse Therapy in Lung Disease

He recalled a paper on this subject which he had read, at the invitation of Sir William Osler, 21 years ago, and compared present technique with that of the earlier lecture. The procedure had, he said, become very much more popular and safer. An important improvement was the cauterisation of adhesions; gratifying successes had as a result been made of cases which previously had been sad failures. Oleothorax was chiefly indicated to preserve successful collapse against impending adhesion; for other purposes it had been perhaps rather overrated. Rupture of the lung no longer left the physician helpless. Its incidence was often prevented by destruction of adhesions, but when it occurred continuous oxygen breathing and the insertion of a "breathing needle" through the chest wall often kept the patient alive until the rupture healed. Along with technical advances in pneumothorax, other methods of treatment had been evolved, methods involving close coöperation between physician and surgeon. Phrenic evulsion was not merely a technique of collapse; it was beneficial for apical lesions, and its value was not measured by the lung-volume reduction effected. The function of the phrenic nerve was still largely mysterious. Thoracoplasty, on the contrary, was strictly a method of collapse therapy, a method which had now lost most of its terrors.

The choice of collapse therapy over other treatments was simpler than it had been. Tuberculin had been given a long and fair trial and had failed. Gold therapy might be urged by a few, but the great hopes it had raised had been followed by great disappointment; the failures outnumbered the successes. The only "alternative" to-day to collapse therapy was the time-honoured air and rest cure, a physiologically well-founded and basic method. Nevertheless, it was scarcely an alternative to, but rather an optimum environment for, collapse therapy. To "try sanatorium treatment first" was unwise; after six months collapse might be unobtainable and the best chance of recovery lost. Even small active lesions without cavitation and with slight symptoms would be benefited by immediate collapse therapy, though many such cases might do well under sanatorium treatment at first. A large proportion of them, however, had severe relapses. The slightest case did better under collapse therapy combined with rest cure than under rest cure alone. The treatment in such cases was usually uncomplicated. The same reasons that argued against postponement of pneumothorax spoke against postponement of phrenic evulsion where pneumothorax was not possible. Phrenic evulsion had such dramatic and immediate results that many authorities would prefer it to pneumothorax as the initial measure, but Prof. Rist did not agree, because pneumothorax might not be possible after avulsion while evulsion would also be available if pneumothorax failed. The so-called "slavery of artificial refills" was a most valuable feature because it kept the patient under medical observation and control. In 50 per cent. of Prof. Rist's cases the results of evulsion had been excellent in six months, but in 13 per cent. only had ultimate recovery followed. Almost all the recovered and improved patients had had sanatorium treatment in addition.

The rule of absolute unilaterality was still golden for beginners, but experienced physicians might take well-advised liberties with the law. Mechanical aid to one lung seemed to stimulate the healing processes of the whole body. Certain types of bilateral tuberculosis, moreover, could now be assisted by simultaneous bilateral collapse: a delicate undertaking but one that had proved valuable all over the world. Many awkward combinations, such as diabetes or appendicitis and tuberculosis, could now be treated successfully with the aid of pneumothorax. The aggravating influence of pregnancy was often obviated by collapse. Other diseases, such as abscess and bronchiectasis, might benefit from collapse therapy. Prof. Rist had had very gratifying results both from pneumothorax and from phrenicectomy in bronchiectasis. Collapse therapy, he concluded, held a central and dominant position in the therapy of lung tuberculosis; it had changed the condition from an incurable to a curable disease.

Dr. R. C. WINGFIELD did not think that the value of pneumothorax could be estimated by a comparison of survival rates, because of the breadth of classification involved and because patients just as surely had tuberculosis after collapse as before and were exposed to the same risks as the average consumptive. Only a study of individual cases would reveal the true benefits of the measure. Its two objects were to promote rest, as a splint, and to obtain collapse of a lung which had been so damaged that its expanded presence was a danger: a form of excision of lung. He suggested that success or failure depended on the behaviour of the visceral pleura and that this was not yet under control. Impatience sometimes persuaded physicians to submit patients to a pneumothorax which produced structural damage to the lung. These possibilities must be given full weight. The institution physician was apt to base his views too much on cross-sections of the disease; he did not follow the case from infection to death. The problem of pleural behaviour demanded much closer study.

For the type of collapse that was equivalent to partial or total excision of the lung some action must be taken; the patient was still at the mercy of his pleura but in rather a different way. There was the danger of lung rupture and an effusion was not always benign. Thoracoplasty did not improve these mishaps and the outlook was black if they did not respond to pleural lavage. It might be wiser to use thoracoplasty in the first case and not dally with a chancy pneumothorax.

Dr. S. VERE PEARSON noted three striking changes in twenty years. Compression therapy was used much more frequently, the method had developed very fast indeed, especially lately, and advances were nearly all due to improved radiological technique. There was, however, a tendency to treat the patient too much on X ray findings; it was essential to take these in connexion with clinical study. In places pneumothorax was not appreciated or practised as it ought to be. An increase in personnel was needed. All mechanistic methods must be superimposed on the sanatorium régime, of which the most important feature was rest. More experience, more knowledge, and more supervision would prevent a number of accidents. The patient was likely to prefer to try pneumothorax before thoracoplasty. For each patient there was an optimum procedure and this was not the same for every case. The questions were not ripe for final decision. Prognosis, nevertheless, had been greatly improved by collapse therapy, thoroughly understood. This depended on an accurate radiological study of the phases, an appreciation of what

was happening, taking every physical, psychological, and economic factor into consideration; and up-to-date knowledge.

Mr. J. E. H. ROBERTS emphasised the importance of doing things at the right time. Some physicians called in the surgeon too late; some expected miracles; some coöperated throughout the case and both together decided when the time had come and what particular kind of collapse should be performed. Often a temporary phrenic operation was indicated: alcohol injection or crushing. Results could not be assessed unless clinical details were known. Phrenic operations might be performed for pain or urgent hæmorrhage and succeed in their object, yet the patient might die of the disease. Nor were all thoracoplasties the same.

Dr. JAMES WATT thought it unfair to quote against collapse therapy such very rare accidents as Dr. Wingfield had described. Nor was he so dubious as previous speakers of the value of mass statistics. Phrenic evulsion, he said, had value as a terminal stage of artificial pneumothorax, to reduce the area into which a lung had to re-expand. Effusions were the commonest complication and much had yet to be learned in their prevention and management. In his opinion they should be drained off freely.

Dr. L. S. T. BURRELL regarded pneumothorax as a medical method and the other methods of collapse as surgical. The immediate results of his cases of artificial pneumothorax were extremely good. Over half the unilateral cases had stood the test of 10–14 years. When the better lung was slightly involved the later death-rate went up enormously, and when the disease was advanced the results were unsatisfactory. These figures, however, did not include good early cases; they were those who were getting worse after six months in a sanatorium. If the patient were treated early enough there was at least a 50 per cent. chance of arrest in unilateral cases; if the other lung were involved at all the chance fell to one-sixth. In extensive bilateral disease life might be prolonged in some cases but the disease would not be arrested by pneumothorax. The operation should be carried out much earlier. One of the greatest risks was pyopneumothorax; it was not so rare that it could be ignored. Another disaster was that effusion which sometimes followed cutting off adhesions. The patient too often took the attitude that he was not bad enough for serious treatment, and might more easily be persuaded to accept treatment if he were offered pneumothorax than if nothing but regular sanatorium life were put before him. For this reason pneumothorax in early cases had value. Modern dramatic methods of treatment might be very striking, but the physician's duty was to try to prevent his patients from ever getting into such a position that they needed drastic measures. Thoracoplasty should only be done when there was resistance and the lung had a sporting chance of resting. Apicolysis exposed the patient to far less shock and was useful for apical cavities. Phrenic evulsion had proved a broken reed as a method of treating tuberculosis.

Dr. F. R. G. HEAF observed that in certain cases collapse therapy was a distinct failure, either because the lung could not be collapsed properly or because the patient had no resistance. For the former case attention must be directed to the adhesions which set up tension in the lung and prevented success. The lung must be relaxed by surgical methods. The galvano-cautery, rather than diathermy, considerably reduced the risk of effusion. Phrenic evulsion was of great value in the early apical case. There was great need for a standard of guidance. Insufficient attention had been paid to the blood; this improved remarkably after collapse therapy and provided a valuable mine of information. The combination of rest and collapse therapy was absolutely essential.

Dr. F. G. CHANDLER asked whether Prof. Rist meant a temporary or permanent cure of bronchiectasis; he himself had never dared to remove the collapse. He believed that artificial pneumothorax was one of the most dramatically successful methods ever devised, but would not apply it to every early case, only to lesions which were spreading, or breaking down, or failing to heal after good sanatorium treatment. Oleothorax had not fulfilled its early promise but had its place, particularly to maintain collapse in the face of obliterative pleurisy. The oil did not rupture into the lung unless an active process remained, in which case the oleothorax should be terminated.

MEDICAL SOCIETY OF LONDON

AT a meeting of this society held on Jan. 22nd, the chair was taken by Sir JOHN THOMSON-WALKER, the president, and Dr. F. J. POYNTON opened a discussion on the value of

Pre-operative Investigation

He said that he made a rule of asking the surgeon to discuss the case with him before the crisis. He endeavoured to gain the confidence of the patient by showing a personal interest in him, so as to remove the "cold wonder" with which so many patients approached the ordeal. He made every effort to avoid hasty operations and to give time for a review of the case and a rest for the patient. Empyema in childhood, coronary thrombosis, and surgical appendicitis were often looked upon as emergencies, but it was rare to have no time for a preliminary survey. Pre-operative measures were particularly important in pyloric stenosis in infancy. The physician must make sure of his diagnosis with the least possible tax on the infant's resources. Dr. Poynton never used a bismuth meal or gastric lavage. Nurses should be chosen with special knowledge of this type of case.

In planning pre-operative methods of anæsthesia it was important to take account of the blood-pressure readings. Paraldehyde given slowly per rectum for 20 minutes in a 1 in 12 solution worked well with children. Highly strung children were grievously affected by forcible anæsthesia. Nevertheless, methods of diminishing fear must not add to the danger of the operation. Avertin lowered the blood pressure by 10 to 30 mm. of mercury and depressed the respiration; it introduced the need for a careful examination of the renal conditions and was not advisable in hepatic disease. It was of special value in toxic goitre, where rest and calm were essential. The success of nembutal varied, and depended somewhat on the temperament and the body-weight; sodium-evipan and pernocton given intravenously were not so suitable for children.

Pre-operative investigations were proving of increasing value, but long-established precautions must not be overlooked. A clinical examination should be made of the chest of an elderly patient with bronchitis or congestion; careful attention should be given to any history, especially of recent influenza in the young. When there had been much vomiting, acidosis must be combated with glucose and salines. A physician could sometimes detect cases in which the cardiac muscle could be improved by rest and tonics.

Where the heart was under suspicion, electrocardiography might help by indicating coronary thrombosis and a damaged myocardium. Children with valvular heart disease stood operations remarkably well, but in dealing with rheumatic carditis there was great advantage in a firm clinical knowledge of the condition and in a recognition of how rarely a paracentesis or opening of the pericardium was required. After discussing the value of the blood tests, Dr. Poynton said that a diabetic patient should be free from ketone bodies and have a normal sugar curve; high carbohydrate diet and insulin might help much in preparation. Persistently low specific gravity of the urine pointed to much impairment of the renal function. In renal surgery it was important to ascertain accurately the functioning power of the kidneys. Lipiodol was of great value when employed by an expert team. The difficulty of all radiographic methods was interpretation. In hepatic and gall-bladder disease there was a danger of hæmorrhage after the operation. A low platelet count gave warning of a tendency to hæmorrhage. The physician or surgeon should always consider whether a particular investigation would so tax the patient's strength as to out-balance the extra information it gave.

Mr. NORMAN LAKE, presenting the surgical side, said that while a complete set of investigations might be advisable, these tests were time-consuming and apt to be expensive. Many practitioners maintained that the older clinical methods gave results comparing favourably with those obtained by the newer aids. But in considering comparative figures it must be remembered that 25 years ago a large number of exploratory laparotomies were performed, whereas nowadays fewer patients were submitted to unjustifiable operations, and fewer left without intervention when operation was necessary. The three chief categories of pre-operative tests were: those devoted to the attainment of greater precision in diagnosis, those directed to the estimation of the operative risk, and those which attempted to estimate the prognosis of the suggested operation. The ability to test the functional capacity of the kidneys did much to reduce the mortality of prostatectomy. Lipiodol had only a limited application in the radiography of the male genital tract, but it was most valuable in demonstrating the patency of the Fallopian tubes. Intrathecal injection of lipiodol sometimes corrected errors of localisation; ventriculography might be of considerable value to the surgeon in localising the obstruction in hydrocephalus. The barium meal gave accurate results in gastric ulcer but much depended on the phase of the ulceration, for the appearance could be modified by surrounding œdema and muscular spasm. In duodenal ulceration the results were far less satisfactory, for the pictures of pre-ulcerative conditions and duodenitis were very similar to that of true ulceration, while in anastomotic ulceration barium was rarely of value. Nor was it much more useful in investigating the appendix, for large numbers of appendices showed slight variations from the normal, and a vicious circle of argument might be established if these skiagrams were taken to represent authentic pathological conditions. The barium enema might also be misleading, especially in the early stages of colonic carcinoma, but in diverticulosis it was paramount and it would readily confirm a diagnosis of Hirschsprung's disease.

The fractional test-meal might prove of supreme value in distinguishing between ulcer and carcinoma if the many pitfalls of the method received consideration. In the presence of an acid curve a partial gastrectomy was indicated rather than a gastro-enterostomy. The test for occult blood was a better indicator of the presence of disease than of its nature. The practical results of cholecystography were far from satisfactory. Perhaps the test was too accurate; the surgeon was more concerned to learn whether the patient's pain was due to some gross pathology in the gall-bladder than whether some slight abnormality was present. The diastase test was valuable in acute disease of the pancreas; if the index was not considerably raised, acute pancreatitis was unlikely; if it was raised, Mr. Lake would not hesitate to make a diagnosis. The prognostic tests when operation upon the sympathetic system was proposed should not be accepted as accurate without critical scrutiny. Finally, Mr. Lake declared that interpretation and not the tests themselves was the weak point, and was certainly capable of improvement with experience. The acumen of the physician was as necessary as in a previous generation. If attention was directed more to the experimental tests and less to clinical, however, the patients would not be losers.

Dr. EDMUND SPRIGGS said that radiology was sometimes valuable in appendicitis; with an appropriate technique over 80 per cent. of appendices could be demonstrated. The enlargement of a barium shadow into a Y-shaped appearance where the barium was trying to creep round a concretion was a help, and so might be the observation that the appendix did not fill and that the region was tender. Cholecystography, in both negative and positive results, was of value. But to find some abnormality was not to make a diagnosis, and the contrary belief was the source of many mistakes. While giving more time to the study of experimental work the physician should not give less to clinical study. In 500 consecutive cases under his care, mostly difficult ones, the diagnoses made before and after the results of investigations were known had been compared: in 40 per cent. the first opinion had been confirmed; in 19 per cent. the revised diagnosis had been quite different; in the remainder it had been modified by the tests but remained essentially the same. Such mistakes as operation on patients with amœbiasis, achlorhydria, or a gastric crisis would be avoided if time could be given to careful investigation. Laboratory tests should never be used as an excuse to cut diagnosis short or dispense with clinical investigation.

Mr. W. H. OGILVIE said that he used cholecystography less and less as time went on. A great many gall-bladders had been reported by eminent radiologists as normal which had been found on operation to be diseased, especially the type which contained a considerable number of small stones and the strawberry gall-bladder. The degree of concentration could not be used as a guide. Some normal gall-bladders did not fill at all. Moreover, the method had a mortality. The value of the fractional test-meal lay rather in enabling the surgeon to decide on the method of operation. It was quite as important in gastric surgery as was the investigation of renal function in prostatic surgery. Gastro-enterostomy was too frequently done without consideration of a high acid level and rapidity of emptying.

Dr. T. JENNER HOSKIN remarked that thyroidectomy for Graves's disease and prostatectomy both required a good deal of preliminary investigation. The basal metabolic rate was not so accurate a guide as had been hoped, and the resting pulse was very nearly as reliable. Substernal goitre should be eliminated by radiography, and the larynx should be examined to see that both cords were satisfactory. Cardiography and cardiac examination were vital. Nevertheless, the most important measures were preliminary rest

and medication and careful selection of cases. Before prostatectomy the most important tests were the water excretion test and the specific gravity. He stressed the need for cardiovascular investigation for elderly patients. A low rather than a high blood pressure was a warning sign. Surgeons were inclined to operate too soon and to pay too little attention to preliminary investigation.

Mr. EARDLEY HOLLAND emphasised the importance of examining the whole patient and not merely the pelvis. Hæmorrhage might be due to microcytic anæmia or local purpura, conditions which a blood count would indicate.

Mr. A. TUDOR EDWARDS confirmed Dr. Poynton's maxim that empyema was not an emergency. Too many chests were opened, he said, before the empyema was ripe, and an extensive empyema or a generalised septicæmia resulted. Some tests, such as the injection of lipiodol into the lung, were a minor operation in themselves and constituted an unjustifiable risk unless done with meticulous care.

Sir WILLIAM WILLCOX held that the proper place of a radiological examination in appendicular disease was after a full clinical investigation, when it served to convince the patient and his friends. Jaundice was sometimes due to the toxic action of drugs such as the atophan group, and this form might be mistaken for catarrhal jaundice. Toxic jaundice was a dangerous condition for operation, and the patient should be given intravenous glucose and strong saline, with large doses of alkalis. In the acute stage lumbar puncture was indicated. Operation on diabetic patients was not alarmingly dangerous but should be preceded by carbohydrates and insulin. Acidosis was a contra-indication, but a certain quantity of sugar was not a disadvantage.

Prof. V. B. GREEN-ARMYTAGE mentioned backache as a fruitful souce of gynæcological mistakes which could be avoided by orthopædic knowledge and radiography. Lipiodol was of great value not only in the diagnosis but also in the treatment of sterility.

Sir JAMES DUNDAS-GRANT spoke from personal experience of the value of palpating the appendix in a hot bath, and asked whether gastric ulcer could be diagnosed by the analgesic effect of a powder such as orthoform.

Mr. ERIC LLOYD remarked that in a fracture of the os calcis the pain was much greater than the functional disability, and was sometimes difficult to locate, but one was entitled to assume that it was in the subastragaloid joint. When the fracture did not involve the joint generally or when the fracture proceeded to ankylosis the discomfort was small, but in the intermediate group it was considerable. It was possible that the ankle-joint might be the cause of the pain, through a tilt in the astragalus. The treatment of fractures of the os calcis might be arthrodesis of the ankle rather than of the subastragaloid joint. If injection of the ankle-joint with a local anæsthetic relieved the pain, the source was almost certainly here and not in the subastragaloid joint.

Mr. WILLIAM IBBOTSON declared that the question of what was a diseased tonsil could only be settled by collaboration with the physician and the bacteriologist. The operation should not be performed on a patient with bad teeth.

Mr. J. ALBAN ANDREWS gave as a good example of the need for collaboration between the clinician and the pathologist the case of early renal tuberculosis.

Dr. MAURICE SHAW asked for a means of foretelling whether the patient would suffer from pulmonary complications, instancing a case in which a patient had died although spinal anæsthesia had been chosen in order to avoid this risk. He divided pre-operative investigation into the four categories of lungs, circulation, liver, and kidneys.

ROYAL ACADEMY OF MEDICINE IN IRELAND

AT a meeting of the section of laryngology held last month, with Dr. P. J. DEMPSEY, the president, in the chair, a paper on

Hoarseness

was read by Dr. O. T. GRAHAM. He pointed out that hoarseness or huskiness is a symptom of disease not necessarily in the larynx but sometimes in regions so remote as the brain or aortic arch. Always it called for prompt and thorough investigation. There were some 50 possible causes of interference with the function of the vocal cords. For clear phonation the cords must be able to (1) approximate, (2) draw tense, and (3) vibrate.

Approximation may be interfered with by (*a*) tumour between the cords, (*b*) feebleness of the muscular action, (*c*) paralysis, or (*d*) fixation.

Tension may be interfered with by (*a*) paralysis, (*b*) feebleness, or (*c*) fixation.

Vibration may be interfered with by (*a*) thickening of the vocal cords by inflammation, infiltration, or neoplasms, or (*b*) growth causing fixation of the vocal cord.

Sometimes, especially in young women, there was functional or hysterical aphonia without evidence of disease; but here one must be careful in prognosis, because what appeared to be a functional aphonia, occurring intermittently, might be the precursor of tuberculous laryngitis. As in other situations, so in the larynx, one of the crucial problems was to decide whether a swelling or ulcer was due to a tumour (benign or malignant), syphilis, or tuberculosis; or a combination of them. To arrive at a correct diagnosis might require a complete history; indirect laryngoscopy; bronchoscopy and œsophagoscopy; a general examination; radiography of the skull, neck, and chest; a Wassermann blood test; bacteriological examination; and microscopical examination of piece of growth.

Evipan in Oto-rhino-laryngology

Dr. P. J. KEOGH read a paper in which he said that from experience of Evipan both for pre-anæsthetic medication and as an anæsthetic he had come to the conclusion that it was pleasant, rapid, and reliable. In all his throat cases the cough reflex had been present throughout anæsthesia. In intranasal work a difficulty was the preservation of a very vigorous sneeze reflex; this, however, could be eliminated by cocainisation. In two cases he had observed a well-marked resistance to the drug, coming on after 7–10 days and persisting for over two months.

Dr. G. P. MELDON said that in a large experience of evipan he had come to conclusions similar to those of Dr. Keogh. He also had observed the sneezing reflex.

Dr. T. G. WILSON showed a patient who had remained well during the three years since he was treated for carcinoma of the tongue. The growth was excised by diathermy and radium needles were inserted into the surrounding tissues.

Dr. L. J. CURTIN showed a patient upon whom he had successfully performed the Rudel frontal sinus operation.

REVIEWS AND NOTICES OF BOOKS

Diet in Health and Sickness

By J. D. COMRIE, M.D., F.R.C.P.E., Physician to the Royal Infirmary, Edinburgh. London: A. and C. Black. 1933. Pp. 240. 5s.

Dietetics for the Clinician

By MILTON A. BRIDGES, M.D., F.A.C.P., Associate in Medicine at the New York Post-Graduate Medical School, Columbia University, New York. In collaboration with RUTH LOTHROP GALLUP, Dietitian. London: Henry Kimpton. 1933. Pp. 666. 32s.

Dr. Comrie's book on "Diet in Health and Sickness" should be of real value to the practitioner. In the space of 230 clearly printed pages he gives a concise account of foods and their composition, and of the physiological principles of dietetics. In view of recent controversies it is interesting to note that he adopts 3000 *net* calories as the standard allowance for a man doing "ordinary physical work," and as regards the vitamins it is refreshing to find the statement that "any person using a diet which contains daily a small amount of fresh animal food and fresh vegetables gets a sufficiency of them." The instructions for feeding in disease are characterised, as is the whole book, by moderation and common sense. There is a chapter on the preparation of food which might be omitted, as it contains little that cannot be found in any book on invalid cookery, and the diagrammatic illustrations of the composition of foods are too small to be of real help; but taken as a whole the book contains all that the practitioner need know about food and dietetics for the ordinary purposes of his work, and its price is commendably low.

Dr. Milton Bridges's book, though a complete treatise on clinical dietetics, calls for only brief notice, for it is designed, as the preface states, for the American physician and his patient, and certainly it is not likely to appeal to the English practitioner. It covers the same ground as various other American text-books and in much the same way, and it exhibits the same tendency as these to over-elaboration of the subject and to treat diseases rather than patients (Part II. is actually entitled "Diseases and their Diets"). The menus, which are numerous and detailed, are a feature of the book, but they are adapted chiefly to American tastes and habits. The book is printed on highly glazed paper, which makes it very heavy to hold.

Teaching of Preventive Medicine in Europe

By CARL PRAUSNITZ. London: Humphrey Milford, Oxford University Press. 1933. Pp. 180. 10s. 6d.

THIS is the published version of the Heath Clark Lectures delivered at the London School of Hygiene and Tropical Medicine in October, 1932, and no more authoritative voice than Prof. Prausnitz's could have been found to cover the large subject indicated. He was responsible in 1930 for a report to the League of Nations on what may be called comparative national hygiene, and since that time he has increased his knowledge by visits to other countries, especially to Russia. Most of the subject matter for the lectures was obtained at first hand by visits to hygienic institutions in Athens, Budapest, London, Madrid, Moscow, Nancy, Prague, Warsaw, and Zagreb, and one of the most interesting chapters in the book is written in connexion with the school of hygiene at the last-named city. Preventive medicine in Yugoslavia is almost inexplicable, for the country is a compost of different nationalities whose political position is difficult and whose internal affairs are notoriously disturbed; and yet it presents a fine example of whole-hearted and successful preventive medical work both in teaching and practical aspects. The author attributes the successful dealing in this new and sorely tried country with manifold hygienic problems to the organising gifts of one man, Dr. Stampar, and that his similars would be welcome in other quarters of Europe is manifest.

Prof. Prausnitz compares, for the various European countries, the training of the medical students, of the medical officers of health, of the technical advisers and auxiliaries, sanitary engineers, health visitors, and so on, and describes the various schemes of popular health and education. He shows that in Germany, France, and Great Britain complicated systems have been gradually evolved out of a variety of previously existing organisations, supplying a composite picture which makes very instructive study. An appendix to the lectures describes the work of the League of Nations and shows that in that most valuable section of international work, the promotion of hygiene, the League has done untold good.

A Short Organic Chemistry

By F. SHERWOOD TAYLOR, Ph.D., M.A., B.Sc., Assistant Lecturer, East London College. London: William Heinemann Ltd. 1933. Pp. 378. 5s.

THIS differs from Dr. Sherwood Taylor's "Organic Chemistry" which was recently reviewed in our columns, in giving a somewhat shorter account of the carbohydrates and heterocyclic compounds and touching only very lightly on purines, terpenes, dyes, alkaloids, and proteins. The theoretical treatment of stereoisomerism, the structure of aromatic compounds, and similar subjects are dealt with almost as fully as in the longer work. The author intended to include all that is likely to be of use to the first-year student of organic chemistry.

Trial of Benjamin Knowles

Edited by ALBERT LIECK. Notable British Trials Series. Edinburgh and London: Wm. Hodge and Co. 1933. Pp. 215. 10s. 6d.

Dr. Knowles, medical officer for the Bekwai district, was tried in 1928, at Kumasi, on a charge of murdering his wife. The acting circuit judge of Ashanti found him guilty and sentenced him to death. The Governor commuted the sentence and Dr. Knowles successfully appealed to the Privy Council against his conviction. Public opinion was stirred at the discovery that the local law allowed an Englishman or Scotchman to be tried for his life without a jury and without a right to legal representation. There was power to remit the case to the Supreme Court of the Gold Coast where these disabilities would not have existed. One ground of appeal was that the Kumasi court had no jurisdiction to try the case as it did; this the Privy Council rejected. The other ground was the absence of evidence justifying a conviction for murder. This contention the appellate tribunal of the Empire accepted, though with the usual disclaimer that it does not sit as a court of criminal appeal. It declines to review criminal proceedings unless satisfied that there has been "substantial and grave injustice." The injustice was this: Mrs. Knowles before she died said the pistol was fired by accident, it had been placed on a chair,

she had sat on the chair and the trigger had caught in her clothing; the judge at trial rejected this story and seemed to regard a conviction of murder as the only alternative. The Privy Council intervened because he never considered the possibility of manslaughter—e.g., if the husband in a fit of drunken recklessness (there had been evidence of alcohol and drugs) had fired a shot to silence a nagging woman and if the bullet had hit her without being intended to do so. This basis of decision put on one side all expert evidence (little as there was in the Kumasi court) as to the angle of fire or the nature of the blood stains. Thus the only medical interest in the case is the light it throws on the possible legal position of a doctor in a country where the laws are devised to suit a backward civilisation. Mr. Albert Lieck has depicted the legal aspects with care. They make a rather sordid trial notable, though Dr. Knowles, had he not died last autumn, might not have cared for this added publicity.

The Practitioner's Library of Medicine and Surgery

Vol. IV.: *Non-traumatic Surgery*. Associate Editor: THEODORE S. MOISE, Jr., B.A., M.D., Surgeon to the Eastern Maine General Hospital, Bangor. London: D. Appleton and Co. 1933. Pp. 1146. 50*s*.

THIS is really a text-book of surgery of considerable size differing from the usual undergraduate text-book only in that on the whole considerations of pathology are curtailed and rather more attention devoted to treatment. The splendid section on the surgery of the heart and pericardium, however, deals fully with the physiological and pathological problems involved. It is written by Claude S. Beck, one of the twenty contributors. There is less than the usual unevenness of a composite volume; a high standard has been maintained throughout. While a practitioner may not be interested in division of the mitral valve he is sure at some time to want to know how to treat a cavernous angeioma. He will find that here excision is recommended and that electrolysis (the only other remedy mentioned) should be avoided. Yet there are regions such as the face where excision is contra-indicated and some other method must be employed. On page 90 appears the following curious statement about tuberculous disease of the breast: "it is not extremely rare, occurring once in every 50 cases of carcinoma." We found few other examples of careless wording; on the whole the work has been revised efficiently in respect of detail as well as of principle, and provides a sound up-to-date account of general surgery.

Doctors in Elizabethan Drama

By MACLEOD YEARSLEY, F.R.C.S. London: John Bale, Sons & Danielsson, Ltd. 1933. Pp. 128. 7*s*. 6*d*.

THE practitioners of medicine and surgery met with in Elizabethan dramatic literature have never been made the subject of systematic study, and Mr. Macleod Yearsley has accordingly written this little book to fill the gap. He reveals in a preface that it represents a small piece of a research which has occupied his leisure moments for a number of years, his ambition being to provide a complete story of the medicine of Shakespeare and his contemporaries. This is a great task, but from the samples of accomplishment which he has already been able to supply, we may well wish him the perseverance to go through with it. Already the author's views on the sanity of Hamlet have appeared and received notice here; the present small book has similar virtues of conciseness and apt quotation in support of theories. The range of reading in the dramatic literature of the period is extraordinary.

Journal of Pathology and Bacteriology

THE issue for January, 1934 (Vol. XXXVIII., No. 1), contains the following papers: The infectivity of neurotropic yellow fever virus for animals, by G. M. Findlay (London). The virus is known to be pathogenic for men, some monkeys, house mice, and guinea-pigs. The author finds that it will also infect field voles and red squirrels, but not cats, ferrets, rabbits, rats, other voles, or birds.—Primary round-celled sarcoma of the small intestine, by J. Gray (Aberdeen). Two examples of this rare condition in a female of 73 and a male of 13.—Two cases of medullo-epithelioma (Bailey and Cushing), with special reference to the relative malignancy of this type of tumour, by J. G. Greenfield (London). Slow growing and not violently malignant.—Transplantation of liver, by G. R. Cameron and C. L. Oakley (London). Experiments on planting bits of liver into the omentum in rats. If the liver comes from another species of animal, it rouses a violent inflammatory reaction and is completely destroyed. If it comes from another rat, the reaction is less intense but destruction is equally complete. If it comes from the same rat the reaction is more moderate and the peripheral cells of the transplant survive; the liver-cells ultimately undergo secondary degeneration and perish, but the bile-ducts survive and show a certain amount of growth.—Histological and experimental observations upon generalised vaccinia in man, by J. H. Dible and H. H. Gleave (Liverpool). A child of 3 months responded normally to vaccination, but the reaction became generalised on the sixteenth day and the child died ten days later. The generalised lesions infected rabbits in the normal manner and proved on histological examination to begin in the substance of the epidermis without any involvement of the connective tissue. Focal lesions were present in the liver and spleen.—Aneurysm of the pulmonary artery with patent ductus arteriosus: report of two cases and review of the literature, by R. D'Aunoy and E. von Haam (New Orleans). A patent duct and syphilis are the most important causes of pulmonary aneurysm of which 87 cases have been recorded.—Pneumococcal hæmolysin; its extracellular nature, production, and properties, by S. T. Cowan (Manchester). Given off into the surrounding medium during growth; it is not type-specific and has no relation to virulence.—Investigations on the *gravis*, *mitis*, and intermediate types of *C. diphtheriæ* and their clinical significance, by D. T. Robinson and F. N. Marshall (Manchester). An inquiry into 542 consecutive cases of diphtheria. The reality of McLeod's types is confirmed, though there are relatively many more intermediates in Manchester than in Leeds. Of 129 *gravis* cases 15 died, of 296 intermediates 44, and of 104 *mitis* 2, in both of which there were other complications. Intermediate and *gravis* types can cause clinical diphtheria in Schick-negative persons but not *mitis*.—The adjustment of the blood volume after transfusion, by A. E. Boycott and C. L. Oakley (London). In the first two or three days after transfusion plasma is expelled until the plasma volume is restored to normal, the blood volume remaining too large by the volume of the injected corpuscles. The injected plasma proteids leave the blood with the plasma.—Obituary notice of Émile Roux (1853–1933), by W. Bulloch (London).—On the concentration and preservation of anti-malignant-cell bodies, by T. Lumsden and T. F. Macrae (London). The antibodies are associated with the middle fraction of the euglobulin and may be further concentrated by absorption into alumina. If wet, they are quite labile, but they keep well dried over phosphorus pentoxide.—A blood-agar tellurite arsenite selective medium for *B. diphtheriæ*, by W. J. Wilson (Belfast). Diphtheroids are inhibited and some strains of diphtheria, though most of the latter will grow well.

THE LANCET

LONDON: SATURDAY, JANUARY 27, 1934

THE BROCK REPORT

In February, 1932, the Minister of Health, Sir HILTON YOUNG, received a delegation consisting of representatives of the County Council's Association, the Association of Municipal Corporations, and of the Mental Hospitals Association, who submitted to him a petition that the controversial subject of eugenic sterilisation be investigated in its scientific and technical aspects by a team of experts. The Minister of Health complied with this request by appointing a Departmental Committee consisting of Prof. R. A. FISHER, Miss RUTH DARWIN, Mr. WILFRID TROTTER, and Drs. A. F. TREDGOLD, E. W. ADAMS, R. H. CROWLEY, and E. O. LEWIS, under the chairmanship of Mr. L. G. BROCK, the chairman of the Board of Control. This Committee was asked to "examine and report on the information already available regarding the hereditary transmission and other causes of mental disorder and deficiency; to consider the value of sterilisation as a preventive measure, having regard to its physical, psychological, and social aspects; and to the experience of legislation in other countries permitting it; and to suggest what further inquiries might usefully be undertaken in this connexion."

The report of this Committee was made public on Thursday, Jan. 18th. A summary of their chief recommendations and findings is given on page 209. Perhaps the most notable feature of this report is the complete unanimity with which it is presented to the public. The recommendations are not a compromise between conflicting views adopted reluctantly in order to secure the appearance of agreement. "On the contrary," say the signatories of the report, "we were fortunate at the end of a long inquiry in finding ourselves in complete harmony." In view of the far-reaching nature of the Committee's recommendations, this fact is important. If serious divergencies of view had led to the formulation of a minority report, the Committee's recommendations would have lost much of their value, in that the public would have been confirmed in its belief that expert opinion was still divided and that no legislative action ought to be taken until that opinion was unanimous.

A second noteworthy feature is that while the principle of voluntary sterilisation is recommended, subject to certain safeguards, that of compulsory sterilisation is uncompromisingly opposed. Excellent reasons for this attitude are adduced in chapter 6 of the report, which were borne out in an address given on Jan. 16th by Dr. EDWARD MAPOTHER at a members' meeting of the Eugenic Society. Commenting upon the German Sterilisation Act, which became law on the first day of this year, Dr. MAPOTHER drew attention to certain unfortunate effects of its compulsory clauses. It will be remembered that nine conditions are specified in the German Act as justifying compulsory sterilisation. Among these are schizophrenia and manic-depressive insanity. These conditions are now notifiable in Germany, and any patient in whom they have been diagnosed becomes a potential victim of compulsory sterilisation. It has already been observed that German psychiatrists now hesitate before making a diagnosis of schizophrenia or manic-depressive insanity, preferring to employ other diagnostic labels, and that patients often conceal, through fear, important elements of their pedigrees. If this spirit of dissimulation becomes widespread, research into the genetics of mental disorder will be much hampered. It is also to be anticipated that the adoption of compulsory sterilisation would afford a rich harvest to the unqualified practitioner upon whom the obligations of notification do not rest. Taking this and other considerations into account, it is to be hoped that instructed medical opinion in this country will support the Brock Committee in opposing compulsory sterilisation, and that it will pay no attention to its advocacy by ill-informed enthusiasts. Speaking of voluntary sterilisation, the Committee state that they were increasingly impressed with the injustice of refusing to those who have good grounds for fearing they may transmit mental defect or disorder and who are unfitted for parenthood, the only effective means of escaping from a burden which they have every reason to dread. "Contraception," they say, "is no remedy, since we are dealing with people, the majority of whom cannot be expected to exercise the care without which contraceptive measures are bound to fail. Nor," they add, "is voluntary abstinence any remedy. Facts must be faced. It is idle to expect that the section of the community least capable of self-control will succeed in restraining one of the strongest impulses of mankind. The mere suggestion is so fantastic that it carries its own refutation. Without some measure of sterilisation, these unhappy people will continue to bring into the world unwanted children, many of whom will be doomed from birth to misery and defect. We can see neither logic nor justice in denying these people what is, in effect, a therapeutic measure." Far from constituting a threat to the liberty of the poor, the legalising of sterilisation will extend to them facilities now readily accessible to the rich. The Committee asked some of the most important hospitals in the country whether they would in any circumstances undertake a eugenic sterilisation. Most replied in the negative. A few said that an individual surgeon might consent to perform such an operation sub rosa, but the hospital authorities would not countenance it. "This," say the Committee, "confirms our belief that the rich can always secure sterilisation and the poor cannot, however great their desire. The evidence before us indicated that there is one hospital in England where a small number of sterilisations have been performed

on eugenic grounds, mostly in cases of hereditary blindness. We know of no other." In regard to conscientious objectors to sterilisation, the Committee point out that their difficulties largely disappear the moment all idea of compulsion is abandoned. "The law," it is remarked, "has long recognised that a man ought not to be compelled to submit to something which he conscientiously believes to be wrong; but the law has never recognised the right of the individual to impose his scruples upon others who do not share his views."

The congratulations of all interested in racial welfare are due to the members of this Departmental Committee and especially to Mr. BROCK, their able chairman, and to Mr. F. CHANTER, their efficient secretary. It is good that the unanimous findings of the Committee leave no issue needing the intervention of a Royal Commission for elucidation. That a proposal to this effect may be forthcoming is hardly to be doubted, but the consequent delay, which in such circumstances can seldom be delimited, would be regrettable. The principle of compulsory sterilisation has been rejected for convincing reasons, outweighing the arguments of its supporters, and with the path thus cleared action should follow.

A BLOOD TRANSFUSION SERVICE

THE London Blood Transfusion Service has become so essential a part of organised medical treatment in London that its presence is usually taken for granted and we have ceased to inquire into the conditions under which it works and the difficulties it surmounts. The existence of this Service in an efficient state of organisation means that at any hour of the day or night any doctor in London can obtain a donor of the specified group, who may be relied on to be free of chronic disease and to have veins that have been passed as suitable for withdrawal of blood. Close on 3000 calls were answered last year alone, so it is obvious that a high degree of organisation exists. As was pointed out in a recent discussion[1] on the Service, its essential structure is formed by the donors. To have obtained a sufficient number of these, to maintain their health and goodwill, and to ensure that they shall be available on the shortest possible notice, is an achievement which demands respect. It is perhaps still necessary to point out that these donors always give their services free, the expenses—which have worked out at 6*s.* 6*d.* per case for the six years during which the service has existed—being met by contributions from private patients for whom donors have been supplied. Municipal hospitals also pay one guinea. Mr. P. L. OLIVER, the honorary secretary, to whom the Service owes its existence and maintenance, referred, however, to two great difficulties with which he has to contend. One is the attitude of the press which, in its zeal to produce a good story of heroism, often exaggerates the effect of the transfusion on the donor, closing reports with a reference to his "greatly weakened condition." The other is the cavalier treatment to which donors are at times subjected by the staff of hospitals. Apart altogether from the unpleasant and wearisome experience of meeting with an unskilled operator—fortunately uncommon—there are complaints of an unwarrantable lack of consideration for the donor's time, and even for his feelings of sensitiveness to the hospital atmosphere and to the sight of patients. Mr. OLIVER reports that a number of record cards are marked "Will not serve at —— Hospital again."

All recruits for the Service are now examined by the medical officer, Dr. H. F. BREWER, who not only groups their blood but makes a thorough clinical examination. Donors are refused if they have a history of old tuberculous affection, or evidence of early apical tuberculosis, pleural effusion, or valvular disease of the heart; also when the hæmoglobin is below 94 per cent. The Wassermann reaction is done in every case, and the veins at the elbow are inspected; very poor veins decide against acceptance of a recruit. Protein sensitiveness, as evidenced by asthmatic attacks, urticaria, and hay-fever, is another contra-indication. But among the last 600 men and women presenting themselves as recruits, it has been necessary to refuse only 3 per cent. The donors have been re-examined to determine the effect on them of the loss of blood and no deleterious effects have been detected. There is a temporary drop of 8–12 per cent. in the hæmoglobin which is made good in 7–14 days, but there is no increase in liability to minor ailments, and although 100 donors have served ten times or more, there has been no loss of time at work, apart from the occasion of the actual transfusion. An adequate interval is insisted on between transfusions; three months has been found sufficient for men and four months for women.

Mr. GEOFFREY KEYNES, who also contributed to the discussion, strongly advocated the citrate method for routine use. Cooling of the blood before it entered the patient's veins he thought a much more likely cause of rigors than any possible effect of the citrate. The questions of reaction after transfusion, and of incompatibility in general, are at present receiving close attention, and in our issue of Jan. 6th (p. 32) some account was given of the precautions now recommended to guard against occasional and unexpected accidents. Often these are due to original faulty grouping and can be avoided only by the methods outlined. Others, however, are explained by the presence of agglutinins which act only when the blood is cooled. Dr. BREWER thinks that the presence of these so-called "cold" agglutinins does not contra-indicate the transfusion, provided that the blood is not allowed to cool during injections.[2] As H. LEUTZLER[3] has pointed out, the factor of dilution is of no little importance: an exsanguinated patient will be more liable to show reaction to injected agglutinins simply because he dilutes them to a lesser degree. In the serum of different

[1] Jour. State Med., December, 1933, p. 686.

[2] See paper by W. Stewart and E. Harvey, THE LANCET, 1931, ii., 399.

[3] Deut. Zeits. f. Chir., 1933, ccxxxix., 18.

individuals, agglutinins have been shown to be present in varying titre, and, of course, the higher the titre the greater the risk of reaction. Both these factors have to be considered in the use of Group O (IV.) as a "universal" donor. It is recognised that the *serum* of the Group O donor is incompatible with the cells of any other group, but, in general, this fact can be disregarded because the much larger volume of the patient's blood dilutes the foreign serum. Trouble does arise, however, if a serum of high titre is injected into an exsanguinated patient. BREWER and I. RAJGORODSKIJ [4] both draw attention to this danger, and the latter advises that only donors without a high titre of agglutinins should be used for emergency transfusions where there is no time to group the patients' blood. All observers insist on the importance of direct cross-agglutination tests between patient and donor before the transfusion. In using a public service it is, of course, unjustifiable, save in very exceptional circumstances, to call for Group O donors for other than Group O patients. The latter constitute 45 per cent. of the population and can receive blood only from members of their own group.

SCIENTIFIC METHOD IN INDUSTRY

THE Department of Scientific and Industrial Research was inaugurated in 1917 with a grant of a million pounds given by the Government for the encouragement of industrial research. It was used for helping coöperative research associations in various industries, and the million pounds has in the last 16 years attracted about one and three-quarter millions from the manufacturers themselves. The original fund is now exhausted, the State contributions being henceforth paid out of annual parliamentary votes, and the report of the Department for 1932–33 appropriately surveys what has been done and what may be expected. The difficulties in the way of persuading industry to involve itself in research and pay even part of the bill were very great; there was—and is—a dislike of scientific method, a reluctance to try new fangled ideas, and above all a belief in the financial value of exclusive knowledge. Medicine, the medical sciences, and indeed almost the whole of biology has, we may be thankful, freed itself from this incubus. After a little dallying with the cold logic of the question, those concerned have come to a general agreement to follow their own good sense and throw any knowledge they may have into the common stock. Like Archimedes, and sometimes with hardly more modesty, the medical discoverer likes to run down the street and tell everyone what he has found out—and he sometimes runs and shouts when he has found out nothing at all. But in any case his heart is in the right place, and no one with an elixir for influenza would nowadays have much hope of success if he tried to sell the secret of his compound to the Ministry of Health; at the most he might get encouragement and a supply of ferrets from the Medical Research Council. People contribute to knowledge according to their ability and they take from it according to their needs. And the million fund has done a great deal to draw industry in general towards this Utopian arrangement. It is even said that the Wool Industries Association has found a method of making wool really unshrinkable and at the same time rather more pleasant than usual to wear; seeing a pair of thick sweaty socks come safely through the wash would help one to believe it. The Launderers' Association has tracked down the causes of the premature destruction of collars in the wash, the flour millers have found that bran is not really as bulky as it seems, and the food manufacturers have good hopes of discovering why bacon tastes different from pork. The various associations, of which there are at present 19, vary greatly in activity and efficiency, from the cotton industry organisation with a staff of more than 200 to the rubber association which scarcely survives. But the bulk of them make useful contributions to fundamental technology and, most important of all, the whole scheme has made a breach in the bad habits of the past which so absurdly overvalued secrecy and competition.

Some study of a condensed report is necessary to get anything like a complete view of the other activities of the Department. Many of them are of some medical interest. A chemical and biological survey of the River Tees from its source to the sea has recently been completed with the aid of the Ministry of Fisheries and the Marine Station at Plymouth; it is the first serious attempt made in this country to ascertain the effects of various kinds of pollution—domestic sewage and trade wastes. Methods have also been found whereby the scandalous desolation of rivers by the effluents from sugar-beet factories can be abolished or at least substantially diminished. The Food Investigation Board is very active, especially at problems connected with cold storage; the intimate changes which occur in frozen muscle, the growth of moulds and bacteria on chilled food, the preservation of fish and apples, and many other hygienic problems have been dealt with. Dental alloys, rubbers, and fillings have been investigated at the National Physical Laboratory, and the Building Research Institute, situated in the recesses of Bricket Wood, has made progress in finding out how to build durable dry warm houses. Atmospheric pollution and its measurement is now in the hands of the Department, which will we hope find the compromise which will give us clean towns without jeopardising industrial success; they might do so more strenuously than is suggested by £500 a year if they realised that tar and soot are among the most active carcinogenic agents known. And, as some people do not know, the National Physical Laboratory is prepared to calibrate hæmocytometers and similar pieces of medical apparatus.

The activities of the Department are indeed prodigious, and natural knowledge is being improved so much that it has in a good many parts become almost unrecognisable. Even a brief contemplation of what has been done makes one wonder where we should now be without the D.S.I.R. and its complement the M.R.C.

[4] Nov. Chir. Arch., 1933, xxvii., 22; ref. in Surg., Gyn., and Obst., 1933, lvii., 468.

ANNOTATIONS

FILTRABLE TUMOURS PRODUCED BY TAR

In the last few years a vast amount of research work has been done on the nature of the tar-induced tumours of mammals and on the filtrable tumours of birds, with the result that important facts have been ascertained as to their chemical, biochemical, and immunological characters. The close connexion between the tar tumours and the spontaneous tumours of mammals has not been doubted, but the position of the filtrable tumours of birds has always been somewhat anomalous, and it is a matter of prime importance to establish a relationship between these two apparently different classes of tumour. In 1923, by means of repeated tar injections, B. R. G. Russell induced sarcomata in rats [1] and a fibrosarcoma in the fowl [2]; neither of these proved to be transplantable. Since that time many successful attempts have been made to induce malignant tumours in fowls by tar and its derivatives. Some of this earlier work has been challenged on the grounds either that the tumours resulted from contamination by virus or that they were spontaneous new growths; but there seems to be no doubt that many of the tumours were the direct result of the tar injections. Up to the end of last year no filtrable tumour has been produced by tar, but now Prof. J. McIntosh has shown [3] that tumours can be produced in birds by tar injections, and that the majority of these tumours are transmissible by cell-free filtrates. The tumours obtained by him were of more than one histological type, and each type bred true in subsequent passage. The tumours occurred too frequently to be considered as spontaneous tumours, and only one tumour resembled a Rous sarcoma histologically. The fact that the same agent which gives rise to mammalian tumours is also capable of producing filtrable tumours in birds provides a clear demonstration of the essential similarity of the two classes of tumour. The transmission by cell-free filtrates shows also that although tar plays the chief rôle in the induction of these tumours, it plays no part in the subsequent cancer process. This trigger mechanism of carcinogenic agents is of especial interest when considered in conjunction with the recent demonstration of the similarity of chemical structure of these agents and certain hormones. It may be that Prof. McIntosh has provided the first planks of a bridge between the adherents of the biochemical and the virus theories of the causation of cancer.

SILICOSIS

Extended experience is establishing more and more the inevitable progress of silicosis, once the lungs are effectively occupied by the dust particles. Hence the recommendation is now made, by the Miners' Phthisis Medical Bureau of South Africa,[4] that men who elect to continue at work after being notified of the presence of the disease in simple form ought not to be penalised later in their claims for compensation when the disease becomes more advanced. On the other hand, the fall which has been steadily taking place in the incidence of the disease on the Rand reflects in a most encouraging way the reduction which has been effected in the dust hazard. One result is that a steadily increasing proportion of the miners are able to stay in service for many years. Such long service men are just those who are most likely to develop silicosis, and thus the crude incidence of the disease until the most recent years continued to increase, and the actual benefit was masked. At last, however, the predominant statistical influence has become the reduced incidence at each year of service; and the year 1931–32, as compared with 1920–23, shows the general liability to contract silicosis to have fallen by no less than 55 per cent. For "new miners," who have only been employed during the last 16 years of bettered conditions, the risk of developing silicosis was actually less by 85 per cent. than that for "all miners" with similar years of service. Apparently silicosis is really being brought under control in the Rand gold mines.

On the experimental side the work of L. U. Gardner at Saranac on the reactions of the lungs to dust inhalation has recently been summarised.[5] A definite series of changes occur; but some dusts are only capable of eliciting a few of the changes, and different phases of the picture follow upon inhalation of various types of pure dust. Silica produces all the changes, ending with nodular formation, asbestos dust, a lesion characterised by a generalised fibrosis; but each dust has to be studied separately and again in combination, since the presence of other dusts seems to modify the reactions. Superimposed microbic infection generally hastens on or accentuates the pathological process and, in the case of silica, has even been thought to be a necessary adjuvant to the process; but Gardner claims to have repeatedly produced in uninfected animals of many species typical silicotic lesions, and his work has received support from recent observations on quarrymen exposed to silica dust made by H. Wulff.[6] We have already referred to the observations of W. R. Jones,[7] which suggest that only dusts having the mineral sericite—a hydrated silicate of aluminium and potassium—present with the silica are harmful, and that in the absence of sericite no great damage results. This view, however, hardly accounts for the terrible incidence of silicosis among flint-knappers, whose only exposure to dust is to that arising from flints which are entirely composed of silica.

The latest contribution to the subject is a close statistical analysis by E. L. Collis and G. U. Yule of English mortality records, in which groups of occupations exposed to dusts containing (*a*) silica, and (*b*) no silica, are contrasted.[8] The somewhat unexpected conclusion is drawn that silica is a body poison, like lead, and that although it exerts its maleficent action mainly on the lungs through which it gains access to the body, it also impairs the circulatory and nervous systems, and the digestive and excretory organs—notably the kidneys and liver—so that should the victim escape death through some respiratory disease, he is more than ordinarily liable to fall a victim to disorders of one of the other systems. That silica has a specific effect on the kidneys has been suggested before, though South African workers have not been able to demonstrate an undue incidence of nephritis in silicotics. In a recent paper Gardner and D. E. Cummings [9] state

[1] Eighth Scientific Report of the Imperial Cancer Research Fund, 1923, p. 65.
[2] Unpublished; reported by A. M. Begg and W. Cramer, THE LANCET, 1929, ii., 697.
[3] Brit. Jour. Exper. Path., 1933, xiv., 422.
[4] Report of Miners' Phthisis Medical Bureau for the three years ended July 31st, 1932. Pretoria, 1933.
[5] Jour. Amer. Med. Assoc., 1933, cl., 594.
[6] Acta Path. et Micr. Scand., 1933, Supp. 16.
[7] Jour. Hyg., 1933, xxxiii., 307.
[8] Jour. Indust. Hyg., November, 1933, xv., 395.
[9] Amer. Jour. Path., 1933, ix. (supplement), 751.

that though crystalline silica injected intravenously settles in the liver and spleen, it fails to do so in the kidneys. They point out that these observations accord with those found in inhalation experiments, and suggest that their findings may be of clinical significance.

OPPROBRIOUS NAMES

THE island of Bornholm is giving its name in medical writings to a sort of epidemic myalgia which was first described there by Madsen in 1930. It is perhaps hardly fair to the islanders, who have no monopoly of this troublesome affliction, and, as Sir George Buchanan remarks,[1] Bornholm should be spared from the fate of a Mediterranean island whose name was once attached to undulant fever on account of its prevalence there. There was a time when the name of some other country—almost any would do—was used for a venereal disease for the origin of which none cared to accept responsibility; but abusive terminology of this kind has died out, although a trace of it may still linger in the application of the term *englische Krankheit* to rickets. Derbyshire neck at one time regarded as a reproach is nothing more now than a curio. To the medical mind the existence of goitre would give added value to the charms of Derbyshire, as no doubt the presence of epidemic myalgia would add interest to a medical visit to the Baltic. Nevertheless such terms as Bornholm disease and Derbyshire neck should be kept within the family and not allowed to circulate outside.

A NEW THEORY OF INDIRECT CALORIMETRY

IF a person's urine is collected over a period of hours and its nitrogen content determined, multiplication by a factor gives the weight of protein metabolised during that time. This accounts for a certain amount of the individual's intake of oxygen and output of carbon dioxide. If these amounts are deducted from the total input and output of these gases respectively, the remainders refer entirely to fat and carbohydrate burnt. The ratios of carbon-dioxide to oxygen involved in the combustion of either of these substances alone being known, the proportions of each in any mixture can be simply calculated from its CO_2/O_2 ratio on combustion. Their proportions once determined in a metabolism experiment, it is a simple matter to derive their weights, since the actual amount of oxygen used by them has been measured. This method of obtaining the weights of protein, fat, and carbohydrate metabolised in a given time is the basis of all methods of indirect calorimetry now in use, for the heat evolved in the combustion of a standard weight of each of these foodstuffs has long been known. But if we now suppose that during the period in question a certain amount of fat has been converted into carbohydrate, it is obvious that oxygen will have been used for a purpose other than combustion, and the calculated weights of fat and carbohydrate burnt will be erroneous.

Prof. E. P. Poulton has subjected to a searching analysis many published figures where, over reasonably long periods, calculated heat production has been checked by actual measurement. He finds[2] that only over a short range of (protein corrected) respiratory quotients do the calculated and observed heat productions agree. Below this range apparently too much oxygen has been used (e.g., by conversion of fat into carbohydrate), and above it too little (e.g., by conversion of carbohydrate into fat). Perhaps in order to make clear his line of argument we are going further than Poulton himself is prepared to go. The conclusion to which he tends is, however, that under basic conditions fat and carbohydrate are metabolised in a constant ratio, and that respiratory quotients suggesting other ratios really indicate concurrent partial oxidations and reductions. This, of course, strikes at the roots of indirect calorimetry as at present practised, but does not necessarily invalidate the method. If a constant ratio of fat and carbohydrate is indeed burnt during basal metabolism, all that is theoretically required is a reliable measure of the actual total amount of combustion. Oxygen consumption does not provide this as we have seen, but carbon-dioxide production may. Poulton actually finds that a linear relationship exists between carbon-dioxide production and heat production.

These conceptions are clearly important, but two points must be emphasised. First, although well founded, they lack as yet definite proof; secondly, as Poulton himself remarks, they do not render the determinations of basal metabolic rate as at present performed entirely valueless. About 0·8 is the commonest value for the respiratory quotient, and in this neighbourhood good agreement between calculated and actual heat production is to be expected; in any case the margin of error is known to be wide. If however a trustworthy basis for measurement of metabolic rate can be found in carbon-dioxide production, this operation will be rendered at once more simple, more accurate, and of greater significance than it is at present.

[1] Brit. Med. Jour., Jan. 20th, p. 120.

[2] Jour. Physiol., 1932, lxxvii., 1 P.; and Proc. Roy. Soc. Med., Nov. 8th, 1932, p. 1591.

CORD LESIONS AND VITAMIN-DEFICIENCY

IT is still somewhat uncertain whether experimental vitamin-deprivation can produce spinal cord lesions and, if so, the extent to which such lesions resemble those of subacute combined degeneration. In 1930 Gildea, Kattwinkel, and Castle reported a patchy demyelination of the cord in dogs after deprivation of the vitamin-B complex, and in the following year Prof. E. Mellanby recorded demyelination of the cord in young dogs deprived of vitamin A. Many have since assumed too easily that Mellanby's experiments indicated a close relationship between subacute combined degeneration and vitamin-A deficiency. In actual fact the description given of the lesions was less suggestive of this type of degeneration than of the kind of change reported in pellagra, lathyrism, and ergotism. A repetition of the work is described in a paper read before the American Neurological Association last May by Dr. Roy R. Grinker and Dr. Ernestine Kandel.[1] Different series of rats were deprived of vitamin B_1, vitamin B_2, or vitamin-B complex, and the effect of vitamin-A deficiency was tried on a small series of monkeys. The histological findings were negative in all experimental groups. Clinically, Grinker and Kandel found that the rats deprived of vitamin B_1, B_2, and B-complex "showed marked loss of weight and weakness. This in turn produced ataxia and incoördination that might well be interpreted as evidence of a serious degeneration of the nervous system. However, one feeding of the depleted vitamin in our series and in those of other observers altered the weakness to such an extent that a more coördinate gait was possible. Furthermore, without the addition of vitamin to the diet, excitement caused the rats to climb the cages and balance on the hind legs." The conclusion was reached that the cord lesions described by other investigators might be

[1] Arch. Neurol. and Psychiat., December, 1933, p. 1287.

dismissed as artefacts. In the subsequent discussion, however, Dr. Weston Hurst made it clear that Mellanby produced definite lesions in the cord; the degeneration demonstrated by Marchi's method was confirmed by the distribution of fatty droplets in sections stained by Scharlach R. It seems desirable, therefore, that this work should be repeated under precisely similar conditions and that the histological examination should be more exhaustive. It is a sad fact that much useful experimental work has been wasted through inadequate histological investigation. The importance of using the same species of animal at the same growth period is perhaps demonstrated by the careful work of M. M. Suzman, G. L. Muller, and C. C. Ungley.[2] These workers were unable to confirm Mellanby's observations, but they used adult instead of young growing dogs. It may be, as they pointed out, that adult dogs are less susceptible to vitamin-A deficiency than puppies. Grinker and Kandel's observations also suggest that clinical evidence of nerve lesions in the animals used for experiment might be weighed more critically. Finally, caution must be maintained in comparing experimental lesions with subacute combined degeneration in man. The histological picture in this disease is sufficiently clear-cut to warrant its distinction from the lesions in pellagra, lathyrism, and ergotism, which are more nearly akin in microscopic appearance to those seen in tabes dorsalis. The fact that frank vitamin-A deficiency is more rarely manifested by human beings than is subacute combined degeneration, and that the latter disease is not relieved by vitamin-A therapy but is improved by intramuscular injections of liver extracts, suggests that some other ætiological agent is at work.

SIGHING RESPIRATION AND THE PSYCHONEUROSES

A PAPER by Dr. Doris Baker in our present issue draws attention to sighing respiration as a condition for which patients often seek relief, and shows that it occurs independently of physical signs of disease but in association with multiple symptoms of a nervous order. The description of these associated symptoms indicates in some cases a state of pathological anxiety which seriously interferes with the patient's happiness and efficiency, and, like most anxiety states, the disorder may persist for years. Dr. Baker's second case offers a picture of the common combination of agarophobia and claustrophobia, with the fear partly converted into dyspnœa, and we must remember that these patients always tend to hide their mental symptoms and stress the physical; there is probably a mass of unsuspected symptoms that the patient keeps to herself. In any collection of anxiety cases there will be found very varied physical symptoms, and whether the symptoms conform to a type —as in the army "disordered action of the heart" and some occupational neuroses—or whether their characters are peculiar to the particular case, they are really but excrescences on an underlying condition. This is becoming more and more recognised by clinicians, and Dr. Baker does good service in making clear the type with sighing respiration as the symptom that the patient emphasises, just as in an earlier paper[3] she separated out the type with left inframammary pain. Though the emphasised symptom is itself unimportant, yet a condition that carries with it years of inefficiency and unhappiness cannot be regarded as trivial. Of the psychoneuroses in general some profit by reassurance and encouragement; sometimes rest and a holiday enable the patient to carry on with the task of life; but without a more systematised attempt at psychotherapy many are fated to remain chronic invalids, a misery to themselves, and a source of worry and expense to their relatives.

[2] Amer. Jour. Physiol., 1932, ci., 529.
[3] THE LANCET, 1930, i., 1280.

SPINAL ANALGESIA IN RUMANIA

FROM its early days spinal analgesia has found high favour with Rumanian surgeons. Their faith is further proclaimed and justified in a consideration of the facts disclosed by a series of over 120,000 cases in the hands of 22 surgeons, 13 of whom belong to the three university centres of the country.[1] The number of deaths in the series was 38—i.e., a rate of about 0·03 per cent. The authors, C. Angelesco and S. Tzovaru, devote their remarks chiefly to this mortality and to the question of securing safety as absolute as possible with spinal analgesia. Figures are of remarkably little value in arriving at the true worth of a method of anæsthesia, and far more useful are exact details of the condition of the patients and of the technique employed. In Rumania careful selection of patients is practised and none are considered suitable for spinal methods if they have an unduly low blood pressure, whether this arises from shock, excessive hæmorrhage, anæmia, sepsis, or any other cause. Circulatory collapse is regarded as the chief danger of spinal methods because of the action of the injected drugs on the sympathetic nerve-supply of blood-vessels; therefore Angelesco and Tzovaru refuse to employ spinal anæsthesia when they have any reason to suspect an already existing sympathetic paresis. This condition excepted, they regard the method as the best for all operations below the diaphragm. Troubles other than circulatory they attribute to technical error which should be entirely preventable. The introduction of ephedrine and of anæsthetic agents less potent than stovaine have, they maintain, rendered spinal analgesia almost devoid of danger if due care is exercised in selection of cases and in carrying it out.

MUCOUS COLITIS

PATIENTS presenting the characteristic clinical picture of mucous colitis are becoming much less common both in England and on the continent; indeed, since the war this condition has largely disappeared. In a discussion at a meeting of the section of physical medicine of the Royal Society of Medicine on Jan. 18th, Dr. A. F. Hurst went so far as to compare mucous colitis to chlorosis in its remarkably decreased incidence in recent years. Unfortunately it continues to be diagnosed because it is not easy to persuade practitioners that the presence of mucus in the stools does not necessarily indicate any form of colitis. The secretion of mucus by the colon, as Dr. Hurst made clear, is a normal function, which acts as a protection to the bowel against either mechanical or chemical irritation. The main causes of increased secretion of mucus by the bowel are: (1) the mechanical irritation of hard fæces in cases of dyschezia or "rectal constipation," due often to faulty habits of defæcation; (2) the abuse of purgatives and enemata; and (3) the chemical irritation of imperfectly digested food in the colon in cases of achlorhydric gastritis. The danger of producing auto-intoxication in harmless colon stasis by the use of purgatives must not be forgotten. Dr. Hurst spoke favourably of his experience of local anal

[1] Presse Médicale, Nov. 25th, 1933, p. 1904.

diathermy, with a conical electrode, for the relief of many forms of bowel disorder, especially anal ulcer, congenital narrowness, and achalasia of the anus. Dr. Geoffrey Holmes outlined the methods of giving intestinal lavage in use at Harrogate, and stressed the importance of extreme gentleness and care in this form of treatment. He had found considerable benefit from the use of the natural waters, given in not greater volume than 2 pints, and followed by immersion baths and douching.

The discussion showed a general agreement that mismanagement of cases of bowel disorder may arise from the application of treatment designed for colitis to patients in whom no true evidence of inflammation is manifest. It is up to the profession to persuade the public that the mere presence of mucus in the stools is not in itself an indication for energetic local treatment.

THE MASTOID EMISSARY VEIN

IT is generally accepted that when infection of the lateral sinus complicates inflammation of the mastoid cells the trouble may spread as a thrombo-phlebitis either forwards to the cavernous sinus or downwards into the internal jugular vein. Treatment consists in clearing out the infected material, and in resecting a portion of the internal jugular vein if a thrombus has formed in the lateral sinus. The possible part played in the spread of infection by the mastoid emissary vein has not received much attention, but inasmuch as it links the lateral sinus with certain veins in the neck it is clearly a vessel of importance in this connexion. Dr. Edward F. Ziegelman [1] reports that he found the vein in three-quarters of 30 specimens dissected, and in 14 it was connected with the occipital vein. This vein may or may not empty into the internal jugular. In 4 instances the mastoid vein emptied into the posterior auricular vein and hence into the external jugular, while in 2 it drained directly into the external jugular. Ziegelman notes further than in "dissections relative to the occipital vein a definite plexus of veins was usually encountered. . . . It may be safely stated that this plexus is prone to anastomose through its many vessels with any or all of the veins of the neck either superficial or deep." He concludes that attention should be paid to the mastoid vein whenever the presence of an infected lateral sinus is suspected; it should be exposed as a step in surgical procedure and ligatured if a thrombus is found in it. Neglect of this possible portal of entry of infection may be in part responsible for the high mortality of lateral sinus thrombosis.

CANCER OF THE LUNG

FROM Melbourne Hospital come four papers [2] analysing local records of intrathoracic tumours. E. Downie shows that in the State of Victoria from 1914 to 1932 reported deaths from cancer of the respiratory organs increased almost steadily year by year from 14·7 to 49·8 per million, while the percentage of respiratory cancer deaths in all cancer deaths rose from 1·8 to 4·2. Like most writers on this subject, however, he hesitates to interpret such statistics as evidence of a true increase, for the figures are based largely on diagnoses unconfirmed by necropsy. In an account of 36 cases of primary carcinoma of the lung seen in the Melbourne Hospital between 1922 and 1932, E. Guttridge demonstrates an abrupt but somewhat unsteady rise in the incidence from 1926–27 onwards. It has been suggested by observers in various parts of the world that dust from the modern tar-paved road may be an ætiological factor in lung cancer, the apparent increase in the disease seeming to coincide with the introduction of road-tarring, and Guttridge remarks, with a note of bitterness, that "the increased incidence of the disease in Australia is as belated as has been the conversion of waterbound macadamized roads to tar paving." S. O. Cowan describes the clinical findings in 20 cases treated in the Melbourne Hospital or in his private practice. In almost all of them the condition could be recognised during life but usually at a late stage. In diagnosis he attaches special importance to the frequent recurrence of pleuritic effusion after aspiration, and also to blood-staining of the fluid, especially in persons over 54 years of age. He mentions also pain and repeated hæmoptyses over a relatively long period as important features, and he concludes that primary cancer of the lung should be suspected in any patient over 40 years of age who presents signs of a chronic pulmonary lesion of insidious onset. In the fourth paper of the series D. Thomas discusses the value of artificial pneumothorax and lipiodol injections in the early diagnosis of lung cancer.

These findings in Melbourne agree on the whole with those recorded from other centres. Most of the tumours which have been histologically investigated have turned out to be carcinomas originating in the bronchi. The disease appears to be commoner in men than in women, and the increase of recorded cases in recent years is striking.

IMMUNISATION AGAINST YELLOW FEVER

ONE unwelcome result of the quickening of land and air communications is the possibility that yellow fever may spread from its present foci to parts of the world, such as India, where its mosquito vector flourishes but is as yet uninfected. The invention of some method not merely of controlling but of eradicating the disease is thus of great importance. Either the vector or the virus must be destroyed, and since annihilation of the mosquito is impossible in the vast areas in Africa and South America now known to be infected with yellow fever we are forced back upon the need for efficient immunisation. The available means of carrying out such immunisation were the subject of Dr. G. M. Findlay's paper read before the Royal Society of Tropical Medicine on Jan. 18th, and he was able to describe some very interesting observations. These dated, he said, from Max Theiler's discovery that yellow fever can be transmitted to mice by intracerebral inoculation. Mice thus inoculated do not develop viscerotropic lesions similar to those found in rhesus monkeys and man but die from an encephalitis, and after serial passage the virus loses its power to produce viscerotropic lesions in monkeys. So far as monkeys and rodents are concerned all efforts to reconvert the fixed neurotropic virus into the viscerotropic strain have failed, and the use of this fixed virus for immunisation has removed many of the difficulties attendant on the use of the ordinary viscerotropic strain, more especially when human yellow fever immune serum is also injected. In their original experiments in 1932 Sawyer, Kitchen, and Lloyd immunised 15 persons by a single injection of a dried mixture of living yellow fever virus (fixed for mice) and human immune serum, with separate injections of enough additional serum to prevent the virus from appearing in the peripheral blood stream. One person was similarly immunised by injecting immune serum and dried virus separately. In this country up to the end of 1933, Dr. Findlay said, 200 persons have been immunised by injections of

[1] Arch. of Otolaryngol., 1933, xviii., 298.
[2] Melbourne Hosp. Clin. Rep., 1933, vol. iv., No. 1.

neurotropic mouse-fixed yellow fever virus and human yellow fever immune serum. They include civil and military officials, medical officers, and nursing sisters of the West African Medical Service, missionaries, traders, and the wives of officials proceeding to the West Coast, as well as laboratory workers. The men numbered 152, the women 48, and they may be divided into three groups, according to the relative amounts of immune serum and virus injected.

Group I. (40 persons) was inoculated subcutaneously in the abdomen with from 0·3 to 0·5 c.cm. of human immune yellow fever serum per kg. of body-weight followed, four to six hours later by from 0·25 to 0·5 c.cm. of a 10 per cent. suspension of virus in normal human serum injected subcutaneously in the arm. Twenty-five (62 per cent.) of those inoculated by this method developed febrile reactions with a rise of temperature above 99° F.

Group II. (110 persons) was inoculated intradermally in the abdomen with 1·0 c.cm. of human immune yellow fever serum, followed two hours later by from 0·1 to 0·5 c.cm. of 10 per cent. suspension of virus injected into the same area. Forty-six (41·8 per cent.) of those thus inoculated developed febrile reactions.

Group III. (50 persons) was inoculated intradermally with 1 c.cm. of human immune yellow fever serum, followed two hours later by the intradermal injection of from 0·00625 to 0·05 c.cm. of 10 per cent. virus, together with the subcutaneous injection of 5 c.cm. of human immune yellow fever serum. Fifteen (30 per cent.) of those thus inoculated developed febrile reactions.

The reactions consisted chiefly of headache, aching in the limbs and back lasting for from 24 to 48 hours, accompanied by a leucopenia and slight bradycardia. In no case did there develop any encephalitis or "paralytic accident," and in only a very small number was the reaction severe.

The sera of 115 persons were examined for the development of immune bodies after immunisation, and it was found that immune bodies begin to appear in the blood stream seven to eight days after inoculation and attain their maximum titre in from three to four weeks. Ten to eleven months after immunisation the immune body titre decreases, but Dr. Findlay said that protective immune bodies can still be detected up to at least sixteen months after inoculation, and probably for considerably longer. Since the introduction of the method, it is noted, there have been none of the accidental infections among laboratory workers which were at one time so common.

EVIPAN IN DENTISTRY

ENTHUSIASM for new anæsthetics is apt to fade as they are better known. This is understandable, for unless a drug is very dangerous many administrations will be required before its full potentialities are brought to light. At the present time evipan is in the stage of welcome, and its transitory action recommends it especially to dental surgeons.[1] It will be a mistake, however, if it is pressed too eagerly into the place of nitrous oxide; for one cannot assume that it may always be used with perfect safety on patients who are to go home soon after an extraction. The speed with which it acts and the absence of unpleasant effects are striking and attractive; and there are patients resistant to gas who will profit by its use. These, however, are exceptional, and we agree with Dr. Stephen Coffin[2] that "the space left between a good nasal gas and oxygen in the chair, and an intubated gas and oxygen (preceded by a Basal Narcotic) in the theatre is small." This is another way of saying that there are very few patients for dental operation who cannot be satisfactorily dealt with in one of the ways he specifies. When such persons are met with they can quite well be treated with ether, after proper preliminaries; so that even here the use of evipan is not essential, though probably convenient and justifiable. For the present, we believe, the latter adjective does not apply to its general employment for ordinary extractions in the dental chair.

[1] Brit. Dent. Jour., Jan. 1st, pp. 23 and 25. [2] Ibid., p. 36.

VITAL STATISTICS FOR 1933

THE Registrar-General has issued a provisional statement of the figures for birth-rate, death-rate, and infant mortality during the year 1933.

—	Birth-rate.	Death-rate.	Infant mortality-rate.
England and Wales..	14·4	12·3	64
118 county boroughs and great towns including London ..	14·4	12·2	67
131 smaller towns ..	14·3	10·9	56
London (administrative county)	13·1	12·8	68

The smaller towns are those with estimated resident populations of 25,000–50,000 at the 1931 census. The birth- and death-rates for England and Wales as a whole are calculated on the estimated mid-1933 population, the remaining rates on the estimated mid-1932 populations.

The Registrar-General remarks that for the fifth year in succession the birth-rate is the lowest on record, being 0·9 per 1000 below that of 1932 and 1·4 below that of 1931. The death-rate is 0·3 above that for 1932 and is the same as that for 1931. The infant mortality-rate is 1 per 1000 below that for 1932, and with the one exception of the year 1930 (60) is the lowest on record. The rates are provisional and are issued for the information of medical officers of health, but they are not likely to require substantial modification.

SIR WILLIAM HARDY

WE regret to record the death on Tuesday last at Cambridge of Sir William Bate Hardy, director of food investigation in the Department of Scientific and Industrial Research. As undergraduate, fellow, tutor, and lastly president of Gonville and Caius College, he was intimately known to more than two generations of scientific and medical members of the University and revered as a leader of the highest standard. To the wider public, through his official positions and his long secretaryship of the Royal Society, his genial personality was a familiar one; in all departments of scientific endeavour he stood as a model of honesty and enterprise. Starting as a histologist his brilliant and flexible intellect made him an authority along different lines of research, as physicist, mathematician, and biochemist, while his investigations in connexion with food storage have had practical results of the highest consequence to the country. His death will be widely deplored.

THE Hunterian Oration of the Royal College of Surgeons of England will be given at the College, Lincoln's Inn-fields, London, W.C., on Tuesday, Feb. 13th, at 4 P.M., by Sir Cuthbert Wallace.

Dr. Robert Hutchison will deliver the sixth Sir Charles Hastings Lecture on the Food of the Growing Child, in the Great Hall of the British Medical Association, on Wednesday, March 7th, at 8 P.M. The chair will be taken by Lord Horder, and after the lecture, which is public, relevant questions may be submitted in writing. Admission will be free by tickets obtainable on application to the financial secretary, B.M.A., Tavistock-square, London, W.C., and seats not occupied by ticket-holders at 7.50 P.M. will be available for others.

THE PREVENTIVE ASPECTS OF MEDICINE

A Series of Lectures in progress during the Winter Session at King's College Hospital Medical School

XII.—EPIDEMIOLOGY AND ITS LESSONS

EPIDEMIOLOGY is the study of disease as a mass phenomenon; the unit of observation is not an individual but a group; in the spirit of this course I shall try to examine some of the problems of herd disease from the standpoint of prevention.

At first it might seem that this study involves no new principles, that preventive epidemiology is no more than a summation of the results of individual preventive medicine, or perhaps an implementing by the community of the results of individual observation. Several of my predecessors have explained to you how the seeds of various illnesses are conveyed by food or drink, and how these seeds may be destroyed. They have pointed out that sometimes the individual consumer can himself use means of protection, but that when one has to deal with an article of universal need, with water or with milk, it is more efficient and economical for the community itself to enforce these safeguards. What then remains for me to say? Perhaps I might interest some of you by telling again the story of how by the application of communal rules a fairly firm control of such illnesses as those of the typhoid group has been established and how neglect of the rules has sooner or later brought retribution. But this is a tale which, however interesting, is much more than twice told. Is there any aspect of epidemiology throwing light upon prevention which has not already been displayed by one of my predecessors or will not infallibly be discussed by some successor in this place? Assuredly if epidemiology is only a summation, an implementing, of studies of individuals, there is no such aspect and I should do best not to add one more to the great number of lectures which annually repeat what has already been said.

But just as the psychology of a crowd differs from the psychologies of the individuals merged in it, so the study of disease as a herd phenomenon while leaving wholly unobserved some matters of vital importance to the physician or even the sanitary administrator brings to our notice other things which are worthy of attention. "If you and I," to quote an able justification by Laurence Alma-Tadema of Maeterlinck's symbolic dramas, "were standing on a height together, we both should be able to realise that the grass was dewy at our feet, that the wind blew from the west, that the sky above us was cloudless and serene. Yet beyond the village in the valley, it might chance that you saw nothing clearly, neither the silver river, nor the spire half-way up the hill, nor the misty peaks beyond. And whilst I stood gazing at what for you existed not, the passing swallow's highest note, the shrill cry of the grasshopper, a hundred insect-voices at our feet, might reach your ears and never pierce my silence. Nor, if we spent the whole day there, seeking to share perceptions, should I be able to make you see, nor you to make me hear beyond the limits of our senses." He whose vocation it is to serve individuals, who has seen a succession of children under one roof struck down by a malignant diphtheria or a bad form of measles, is likely to be a little impatient with persons who spend much of their time meditating over cages of mice, will not be greatly impressed by the English Hippocrates' epidemic constitution, may even be repelled by the magnificent aloofness from human passion of Hippocrates himself. On the other hand, the student of experimental epidemiology, whose subjects are but mice, whose complaints, if they complain, are inaudible to him, may be a little unduly contemptuous of the hasty empiricism and pragmatic philosophy of those whose patients, or official masters, are passionate fellow creatures.

If, for a few minutes, I expound the philosophy of the experimental epidemiologist, and that philosophy seems arid, I hope you will not infer that we who study these problems are "superior" people. To those of you who are near the beginning of your medical studies, measles may not seem an interesting object. Medical students are apt to think that measles is a little beneath their notice; it is not really exciting like syringomyelia or progressive muscular atrophy. Many people have never seen a patient with progressive muscular atrophy. Hardly anybody has not seen a patient with measles, even if only in a looking-glass. But in 1932 3411 deaths were attributed to measles, and as the Table shows measles is a very respectable cause of mortality. It has been a very respectable cause of mortality for at least 350 years. We can look at measles from the individual and from the herd point of view. From the individual point of view, with our present knowledge, measles is a very satisfactory object of study. In the middle and upper classes, measles has not been for some time at all a deadly disease; it is as certain as anything in practical medicine that if a townsman can avoid catching measles until early childhood is past that the danger to life of an attack is very small. The children of the relatively prosperous classes, who do not mix with children of less prosperous people, have little to fear. But poorer children without these advantages are now very much better off than their predecessors; the excellent work recently published by the London County Council makes it probable that, by the use of normal adult serum, prophylaxis or great attenuation of severity can be assured. This is highly satisfactory, but there remain one or two difficulties if we take the group point of view. One is, of course, the thorny question of change of type. Rather more than a century ago our professional great great grandparents were on very good terms with themselves owing to their conquest of scarlet fever which, at the beginning of the nineteenth century, had been a very deadly disease, but between the end of the last war but one to end war and the absolutely final triumph of parliamentary reform (in 1832) killed very few

ENGLAND AND WALES.—*Death-rates at ages under 15 years per million living from Measles, Scarlet Fever, and Diphtheria, 1856–1930.*

Year.	Measles.	Scarlet fever.	Diphtheria.
1856–60	1185	2201	1379
1861–65	1265	2646	1422
1866–70	1180	2589	891
1871–75	1023	2018	807
1876–80	1051	1806	726
1881–85	1138	1160	848
1886–90	1313	656	799
1891–95	1174	498	896
1896–1900	1260	380	893
1901–05	1016	366	668
1906–10	930	257	503
1911–15	1110	185	444
1916–20	665	96	449
1921–25	449	92	310
1926–30	381	55	302

children. We know the end of that story. The great clinician Graves pronounced the funeral oration over our great great grandfathers' beliefs.

"The long continuance of the period during which the character of scarlet fever was either so mild as to require little care, or so purely inflammatory as to yield readily to the judicious employment of antiphlogistic treatment, led many to believe that the fatality of the former epidemic was chiefly, if not altogether, owing to the erroneous method of cure then resorted to by the physicians of Dublin, who counted among their numbers not a few disciples of the Brunonian school; indeed this opinion was so prevalent, that all those whose medical education commenced at a much later period, were taught to believe that the diminished mortality of scarlet fever was entirely attributable to the cooling regimen and to the timely use of the lancet and aperients, remedies interdicted by our predecessors. This was taught in the schools, and scarlet fever was every day quoted as exhibiting one of the most triumphant examples of the efficacy of the new doctrines. This I myself learned—this I taught: how erroneously will appear from the sequel."

Between 1834 and 1870 scarlet fever was one of our deadliest diseases. That was the most striking instance of change of type in English experience down to the more recent change in the type of endemic small-pox and equally inexplicable in terms of deliberate human actions. Measles *may*—the late John Brownlee would perhaps have said *must*—have similar surprises in store for us. A second difficulty is the following. Suppose, for the sake of argument, that we could make an end of *clinical* measles in this generation; that in a population of which, perhaps, 80 per cent. now pass through a clinical attack of measles and nearly all the remainder through a subclinical attack, we could so organise the distribution and use of adults' serum that none of the children born into the population suffered an attack. If the immunisation is purely passive, then, after a shorter or longer interval, the protected will again be liable to attack if exposed to risk. But, if the volume of infection be reduced as, under the assumed circumstances, it would be reduced, there might be no epidemic measles for a long time. When it did come, would it be very deadly? Our blood is sometimes curdled by those who tell us that mere environmental reforms only postpone an evil day. Indeed in this very case of measles, more than a century ago Robert Watt of Glasgow gloomily speculated as to whether the prevention of small-pox by vaccination really made any difference, since, as it seemed to him, the only result of saving lives from small-pox was to sacrifice them to measles which was he thought becoming more deadly as small-pox declined. "We may, it seems," he wrote, "by the permission of Divine Providence, deprive death of some of his apparently most efficient means, but deprived of these, new means are discovered or the old improved." Or, as we less sonorously might write, what is gained on the swings is lost on the roundabouts. If we put off the evil day, will it be so *very* evil when it does come? Most of us have heard of the ravages of a new disease in virgin soil, in particular those of measles when introduced into the Fiji islands nearly 60 years ago. But it does not appear that the ravages of measles there were due to any particular malignancy in the type of the disease itself but rather to the impossibility of affording adequate nursing to the large numbers of sick. Indeed A. Hirsch was of opinion that on those grounds alone one could sufficiently explain the havoc made when measles broke out in places which had been unvisited for long.

As usual in epidemiological matters, it is not easy to be sure. The facts of the great epidemic of 1875 are these.

Measles was introduced into Levuka in January, 1875, certainly from a warship with patients on board, probably also from a brig. The introduction of infective patients coincided with a gathering of some 500 native chiefs and their retinues. The chiefs paid a complimentary visit to a house only 11 days after a person in it had fallen sick of measles. That was on Jan. 25th. The chiefs then dispersed, and five weeks later it was reported that "all the chiefs who came to Levuka have measles, and it is spreading rapidly. They attribute it to poison and treachery. The attacks are so sudden and complete, that every soul in a village will be down at once; and no one will be able to procure food, or if obtainable, to cook it for themselves or others. The people have died from exhaustion and starvation in the midst of plenty." The havoc made was indeed appalling. It was estimated that not less than 40,000 persons died. After the epidemic the population numbered about 110,000 Fijians, 4000 Polynesians, 300 half-castes and 2000 Europeans, Americans, and Australians, in other words a rate of mortality of the order of at least 25 per cent. was experienced. The evidence that this fatality was not primarily due to an exceptional malignancy of the disease is as follows. In the corps of native constabulary, 147, all took measles but only 9 died. These men lived in barracks under military discipline and submitted to a normal sickroom routine. The bulk of the natives, on the other hand, received no care; when help was available they refused it—there was a widespread belief that the epidemic had been provoked either by the Europeans or was due to the political annexation then taking effect.

Thirty-six years later a similar catastrophe occurred on the island of Rotuma, distant 260 sea miles from the nearest part of the Fijian archipelago. The enumerated population of this isolated place, having an area of 14 square miles was, on Nov. 27th, 1910, 1983. On Jan. 29th, 1911, a steamer with a patient suffering from measles called at the island. There was no medical officer there at the time and measles had never visited the island in the lifetime of the generation then living. In 1911, of the 1983 inhabitants, 489 died, giving a death-rate of 24·7 per 1000. The mortality was especially heavy between the ages of 20 and 25 years. Of this total 326 were directly assigned to measles. Tuberculosis, prevalent enough before, accounted for 26 deaths. The epidemic of measles lasted through February, March, April, and May. Clinically the disease was complicated by acute ileo-colitis—a very fatal complication. In the paper by B. G. Corney, from which I am quoting, no details are given as to the attitude of the natives towards European treatment. But it is evident that so small a community overtaken by a universal disease would be in no case to employ what we should consider adequate care of the sick. Here again there is no conclusive evidence that the measles introduced would have run so catastrophic a course had nursing facilities been available.

I am not sure that this reasoning is wholly convincing, but it is, I think, sufficiently cogent to entitle us to believe that the advantages of bringing measles to even a temporary end would outweigh the disadvantages. However, these are only speculative opinions; let us return to the study of measles as it actually presents itself. Measles exhibits, as a herd event, a periodicity, a tendency for epidemics to recur at regular intervals, it flows and ebbs like the tides.

No doubt if the high tide of measles were always at the same time in the solar year, we should be very tempted to explain it on meteorological lines, just as we account for the prevalences of coughs and colds in the autumn and early spring, by the frequent changes of temperature. Whether that is a sufficient explanation of epidemic coughs and colds I need not discuss, since it certainly does not help us with measles. The high tide of measles may occur all round the solar clock. The late John Brownlee showed that in London, over the period 1840–1912, the principal elements in the tide of measles went through its cycle in 97 weeks or very nearly 1¾ years,

so that even within one generation it would pass from summer to winter. That of course does not mean that the tide is not complex, that there are not other constituents, simple seasonal, annual, &c., but this is the principal one, the basis of the popular saying that in London one has an epidemic of measles every two years.

There are two explanations of this herd phenomenon, quite distinct but not mutually exclusive. Brownlee himself was inclined to attribute most weight to the view that the periodicity was a function of the infecting organism and had nothing to do with the host. His principal reasons for this view were that in different cities the periodicity of measles, the interval between high tide and low tide, was different and that in the same city it changed from time to time. Further, in one and the same city there were different periods in different parts and, as he thought, the manner of spread of these different epidemics was different.

These results seemed to him difficult of explanation on the alternative and older hypothesis so categorically laid down by Hirsch, who had said in his best professorial manner that "the recurrence of the epidemics of measles at one particular place is connected neither with an unknown something (the mysterious number of the Pythagoreans), nor with 'general constitutional vicissitudes' as Köstlin thinks; but it depends solely on two factors, the time of importation of the morbid poison, and the number of persons susceptible to it." That is that, of course, but the professor never condescended to mere arithmetical tests. Other epidemiologists did; notably Sir William Hamer who was able to show that the periodicity of London measles could be reasonably well described merely on the hypothesis of changes in the number of susceptibles. Sir William's hypothesis was re-examined a few years ago by the late H. E. Soper who expressed it in the following way.

We know that a case of measles is derived by infection from a pre-existing case and there is good evidence that the period of time during which a patient is infective is quite short. Suppose we were able to record cases with the incubation period as the time limit. Suppose, for instance, that the incubation period were rigidly 14 days. Then if we know the number of cases occurring within a period of 14 days, the number which will occur in the next 14 days must be some multiple of the known number. We may suppose that the multiplier will depend on the available susceptibles and the ease with which they are infected. The simplest hypothesis would be to make the multiplier a fraction, the numerator of which was the number of susceptibles available, and the denominator some multiple of the number of susceptibles added in the unit of time.

If numerator and denominator are equal and the previous fortnight's cases equal to the accessions of the fortnight, one has a state of equilibrium; suppose there are 10 cases of measles a fortnight in some smallish town and 10 susceptible children introduced *per vias naturales* or otherwise also numbered 10 a fortnight, then if each of the 10 cases generated a single fresh case, we should have a state of equilibrium, a steady fortnightly score of 10 cases. This might be imagined to arise in this way. Suppose that at the beginning of the next fortnight there were in the population 100 children who had not had measles and that we took this 100 as the numerator of a fraction, the denominator of which was also a hundred, obtained by multiplying the fortnightly accessions—viz., 10 by 10. Then we obtain the next fortnight's total by multiplying the previous fortnight's score by 100/100, and have again 10. The next multiplier will be $100 - 10 + 10 = 100$ divided again by 100—viz., 1 and so on. This is trivial and obvious. But now suppose the fraction to be altered either by changing the numerator or the denominator. This might happen by the numerator being increased—for instance, some children previously insusceptible might become susceptible. Suppose the 100 increased to 120. Then the fraction is $120/100 = 1{\cdot}2$ and instead of 10 cases next fortnight we have 12. The next fraction will be $120 - 12 + 10 = 118$ divided by $100 = 1{\cdot}18$ and the new score of cases is $12 \times 1{\cdot}18 = 14{\cdot}16$. Proceeding in this way we shall find a series of numbers which repeat themselves in approximately 20 terms—viz. (to nearest whole numbers), 10, 12, 14, 16, 17, 17, 16, 14, 12, 10, 8, 7, 6, 5, 5, 5, 6, 7, 8, 10. The steady state of 10 once departed from in the way indicated, but other conditions remaining the same, measles will flow and ebb like a tide.

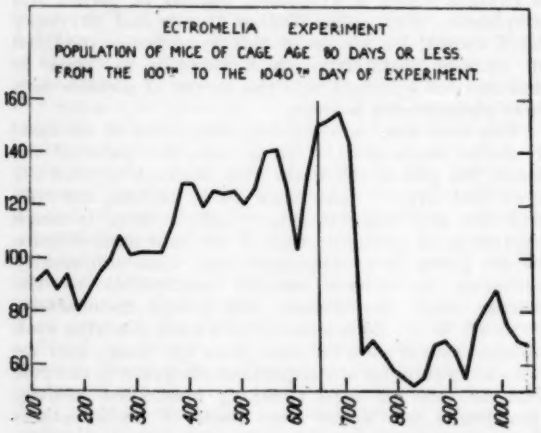
Of course natural phenomena are not so simple as that. Even in what the statistician would call a stationary population—i.e., one in which the births were equal in numbers to the deaths, the rates of mortality at ages unvarying and no migration occurred—neither measles nor any other disease has a rhythm which is absolutely regular in period and amplitude. But, as Sir William Hamer and Mr. Soper have shown, by means of this hypothesis—modified in various particulars which there is no time to discuss—some insight into the nature of measles as a herd phenomenon is given.

This may seem a rather depressing view of the case. It rather looks as if—"all is vain, the pulse of the heart, the plot of the brain, that striveth beyond the laws that live;" that, once set in motion, the tide will ebb and flow for ever. Indeed there *is* much experimental evidence that if an infectious disease be set going in a community and that community continues to receive recruits susceptible to the disease, then the disease will persist indefinitely. Prof. W. W. C. Topley and I have been studying such communities of mice for more than ten years, and we have not yet found any important exception to the rule that an infected herd receiving unselected healthy immigrants will never clear itself of an infectious disease.

But, even if this be a law, if we must always have measles or scarlet fever in such herds as ours, there is surely much difference between the scarlet fever of 1850 and 1930, and it is worth while trying to learn what are the herd circumstances which make for high and what make for low rates of mortality, from a sickness which cannot be eliminated. That is indeed the purpose of experimental epidemiology. One seeks to simplify the conditions in the hope of lighting upon a helpful and instructive analogy. I should like to direct your attention to a case which is suggestive. Prof. Topley, Dr. Joyce Wilson, and I have been studying for some time the herd behaviour of an infectious disease of mice known as ectromelia. This disease has two analogies with human measles. In the first place it is a virus disease and in the second place, mice who have survived one attack of it have usually acquired a very high degree of immunity against subsequent exposure. While in such bacterial infections as pasteurellosis or aertryckal infection, the death-rate of mice who have survived a long time in an infected herd is much greater than that of unexposed mice, in ectromelial infection mice who manage to survive 60 or 70 days are subject to a death-rate comparable with that of unexposed mice. We have studied an infected herd which has been maintained for nearly three years, an immense period on the time scale of mice, whose life span is not more than one-thirtieth of human life, equivalent to at least 90 years of human time. I have neither the time nor, as a full account of the work has not yet been published, would it be proper to enter into full details. I will

merely direct your attention to the Diagram. This is based on the number of mice under 80 days of age, present in the community at intervals of 20 days. The herd is kept going by adding daily to it three healthy mice.

Now if no mice died at all, at ages under 80 days, then on and after the eightieth day of the experiment (if we started with an empty cage) the population at ages under 80 would consist of 240 mice—viz., three new comers, 3 mice of cage-age 1, and so on. As you see, the population never approached that figure because mice were dying of the infection (had there been no infection, the population would have fallen little short of 240, since we know from direct observation of healthy mice that of those surviving to the age of 100 days as many as 97 per cent. will actually survive another 80 days). But from the hundredth day of the experiment the population tended to increase. It fluctuated, there are tides, not of constant period, but the trend is upwards, and at the end of July, 1932, the population had reached 152. A little later, at the point on the chart through which a vertical line is drawn, the



little community—like the rest of us—was subjected to a day or two of intense heat. We all remember August 19th, 1932, when the Greenwich thermometer touched 98·9° F., the second highest point ever recorded. An immediate consequence was the death of some 30 mice. That did not at once arrest the progress of the herd, the highest level of population was indeed attained a few days later. Then the *dégringolade* began. Mortality, specific mortality, due to ectromelia, began to increase among the younger mice—not the very youngest but those of cage age 20 days and thereabout, then it rose in all mice. As you see, the population suffered a calamity like that of the Fiji islands; from 168 it sank to 62, flickered up, fell again to its nadir of 55, and then resumed a course similar to that of 800 days before.

This is, I think, a very instructive experiment. One has a herd in which something like an equilibrium has been established. For a long stretch of time the rate of mortality had varied very little; it was just not enough to keep the population steady, the community was growing slowly, but it seemed clear that one was approaching general stability. Then a wholly extraneous misfortune occurred. It seemed to be only a small misfortune, a little heap of deaths. But in some mysterious way that event altered everything. What had seemed to be a stable equilibrium was shown to be delicate balance.

Remember that on an appropriate scale of time these events—transformed from the time coördinates of mice to those of men—were a matter of more than 80 human years. One thousand days in the life of a mouse herd would be equivalent to 30,000 days, say 82 years, in the history of a human herd.

The first explanation which suggests itself is that one has to deal with a cyclical phenomenon the amplitude of which was changed by the extraneous factor. That, however, cannot be the reason. In the first place, the variation of mortality in the herd was rather of the nature of fluctuation than true periodicity; periodogram analysis has failed to unmask any well-defined periods. Since, however, the population was but small that criticism is not sufficient; there might be an underlying periodicity so masked by chance fluctuations—due to paucity of numbers—that we could not define it. But, waiving this, the course of events after the catastrophe is not similar to that of a periodicity of the simple type I have described above. The following arithmetical considerations make that plain.

Suppose that when the population amounted to 158 a virtually stable state had been reached, so that the 60 entrants of the 20 days just balanced the exits. That would mean that the multiplying ratio was 158/158. Now let us suppose that corresponding to the next period when the population was reduced to 144—i.e., the exits exceeded the entrants by 14—the denominator became 100, so that the factor multiplying 74 became 144/100 = 1·44. Then carrying out the arithmetical process described above, the populations counted on each successive twentieth day would be 144, 97, 54, 58, 86, 118, 145, 158, 143, 96, 53, and so on. We should have again a regular cycle and come down to a minimum of population close to that actually observed, but the recovery to the old level would be far more rapid.

It is seen that the recovery from the trough of depression has been much slower than such a hypothesis would involve. The process is far more complex.

In such a herd as this there are present animals of all grades of immunity. One may roughly contrast the youngest mice, those of cage age less than 20 days, who are very sensitive but have not been members of the herd long enough to have had time to die, mice older than this subject to the full force of mortality, and finally mice who having lived more than 80 days are, whether by virtue of mortuary selection or active immunisation, relatively immune. This community is exposed to an infection and the powers of the virus as a destructive agent may well depend on its manner and rate of circulation through the group. The aged and resistant mice are not, by virtue of their resistance, necessarily without importance to their fellows. Perhaps *they* are the main sources of infection. Let us consider the time sequence of events in this herd, after the heat wave, as it affected the mice of different ages. The first age-group to suffer a serious and continuous disturbance of mortality was that aged 20–40 days; in this group the rate of mortality began to rise within 10 days of the heat wave and had not resumed its normal trend within 160 days. The age-groups 40–80 and 80–150 were affected nearly as soon but to a less extent; the mice of seniority 150 days were hardly affected at all at first and indeed only show disturbance at an epoch so late that the effect is being exercised mainly upon animals which reached this seniority *during* the epidemic. The very young mice show no general change of mortality level until some 70 days after the exciting cause. It seems then that a new equilibrium on a lower level had become established and that only very gradually, if ever, would the herd regain its original position.

If it be suggested that one has taken a *post* for a *propter*, that what happened in this herd had no causal relation with the heat wave, it may be replied that in a wholly distinct herd a similar sequence was observed, but, since for other purposes that herd was

broken up after the epidemic made head, I cannot provide details over so long a period.

There is, I suggest, one important lesson to be learned from this experiment—viz., when we have to do with a disease which is, to speak commercially, a going concern, we should be exceedingly chary of boasting that the business is stable. On the time scale of mice, ectromelia has been stable in the herd a good deal longer than scarlet fever has been in modern English experience. An accident of fate plunged our herd back into an epidemiologically different world. I suggest that before we sing a *Te Deum* over, say, scarlet fever and small-pox, this warning should be had in mind.

Perhaps you will infer that the teaching of experimental epidemiology is blank pessimism, that it leaves epidemics as curious, inevitable phenomena, interesting objects of academic study. That is not what I have learned from it. These herds of ours are slum populations, in the worst sense of those words. The difference between the mortality of mice subject to these conditions and of mice not deliberately herded with infective companions is much greater than the difference between the general mortality-rates of the seventeenth and twentieth centuries in London.

What we should learn from such an experiment is that, under slum conditions, a population is always living in a state of unstable equilibrium and that the existence of a favourable rate of mortality, even its continuance over a very long period, is no sure guarantee of safety. If one can find, as perhaps one can, some community in which, in spite of overcrowding and insufficient or inappropriate feeding, measles is at a low ebb, at a lower ebb than in some other community where the environmental conditions are apparently better, it does *not* follow that what has been done in the second community was futile. The mills of God grind slowly.

It would be foolish to pretend that epidemiology is yet a science in the sense that chemistry or geology is a science or even in the sense that meteorology is a science. We sometimes make merry over the failure of the pontifical utterances broadcast to us to correspond with our experience; it is pleasant when we have been told that there will be rain in the south-east to enjoy the sunshine. But we are not so surprised very often and the Air Ministry does not wait to issue a warning of rain until the rain begins to fall. Epidemiologists generally do and with reason. We may indeed foretell an epidemic of measles with some confidence, but even then we shall refrain from forecasting its magnitude; we preserve in the face of influenza a more or less discreet silence. But it is not so very long since weather forecasting was as imperfect as epidemiological forecasting is now and perhaps a few generations hence, when, by dint of experiments on herds under controlled conditions, we have learned what signs to watch, we shall be able to foretell what is now unpredictable; be able here also "to look into the seeds of time and say which grain will grow, and which will not."

MAJOR GREENWOOD, D.Sc., F.R.C.P., F.R.S.
Professor of Epidemiology and Vital Statistics in the University of London (London School of Hygiene and Tropical Medicine).

SPECIAL ARTICLES

BACTERIOLOGY OF AN OUTBREAK OF INFLUENZA IN A SCHOOL

BY R. LOVELL, Ph.D., M.R.C.V.S.
EDITH A. STRAKER, M.B. Lond., D.P.H.
AND
JOYCE WILSON, M.B. Camb.
(*From the London School of Hygiene and Tropical Medicine*)

FOR some years past a study has been made in this laboratory of the fluctuations that occur in the nasopharyngeal flora of a sample of the adult London population. This study, which has been aided by a grant from the Ministry of Health, forms a continuation of a similar investigation carried out in Manchester during the years 1925–27.[1] It is still in progress, and it is hoped to continue it for a sufficient period to allow random fluctuations to be distinguished from those that are significantly correlated with synchronous epidemiological events.

For purposes of comparison with our adult population, we desired to obtain figures for a different age-group living under different conditions, and during the period October, 1932, to March, 1933, an opportunity was afforded us of obtaining nasopharyngeal swabs from a sample of boys at the Royal Hospital School at Greenwich. For this opportunity we wish to express our thanks to the school authorities, and particularly to Surgeon-Captain P. May, the medical officer of the school. Two sample swabbings were taken in the Christmas term of 1932, two in the Lent term of 1933. Towards the end of January, 1933, the school suffered from a sharp epidemic of influenza, and we were able to examine nasopharyngeal swabs from 152 of the 238 cases. We thus obtained records of the nasopharyngeal flora of a sample of a semi-closed community before, during, and after an outbreak of influenza. Since, so far as we are aware, similar records are not at present available, the results seem worth a brief report. The main interest obviously attaches to the findings in regard to the frequency of *Hæmophilus influenzæ*, but the figures for pneumococci and hæmolytic streptococci may be included for comparison. Other organisms may, for the moment, be neglected.

TECHNIQUE

The technique adopted in all swabbings was briefly as follows: West's swabs were employed, and these were inoculated on to a blood agar plate (5 per cent. horse blood), a plate of Fildes' medium,[2] and into a tube of blood broth. All cultures were incubated at 37° C. The plates were examined after 24 and 48 hours. After 24 hours' incubation, 0·5 c.cm. of each blood broth culture was injected subcutaneously into a mouse. All mice dying within five days were examined post mortem, cultures being taken from the local lesion and the heart's blood on plates of blood agar and Fildes' medium. Mice surviving on the fifth day were killed and examined in the same way.

The criteria that have been adopted in identifying the bacteria concerned are as follows:—

(1) *Hæmolytic streptococci.*—Morphology and colony form, the production of β hæmolysis on blood agar plates, and the production of a soluble hæmolysin in serum broth.

(2) *Pneumococci.*—Characteristic morphology, colony form, and bile solubility, the latter tested by the addition of one or two drops of a 10 per cent. solution of sodium desoxycholate. All strains of pneumococci were tested

serologically against a wide range of type-specific agglutinating sera, and we are indebted to Dr. G. Cooper of the Rockefeller Institute for specimens of sera prepared against the 29 new types which she and her co-workers have described (1932).[3] We need only note here that we have been able to identify about half the strains isolated from the boys at the Royal Hospital School, and that the types most frequently encountered have been IV., XII., XXII., XXIV., and XXIX. Among the 571 swabs taken between October, 1932, and March, 1933, Type I. was isolated once only, Type II. twice, and Type III. on ten occasions.

(3) *H. influenzæ*.—Our criterion here has been growth on Fildes' medium, associated with the usual colony form, and failure to grow on ordinary agar. As regards morphology we have met with the wide variation encountered by all workers, from the characteristic small cocco-bacilli to bacillary and filamentous forms.

We have classified our strains as "typical" and "atypical," including in the "typical" only the small cocco-bacillary or small bacillary forms, or strains in which these forms were overwhelmingly predominant. All strains have also been tested for hæmolysis and for indol production Hæmolytic strains have been rejected, as not conforming to the specific characters of *H. influenzæ*. We have recorded separate carrier rates for the indol-positive and indol-negative groups, since earlier findings (see Report 1930)[1] suggested a possible association of indol-positive strains with influenza, and we have noted (1930)[1] in agreement with Dible (1924)[4] and Smith (1931),[5] that indol production is far more frequent among morphologically typical than among atypical strains. We are not able to say whether any of the strains isolated by us during this period corresponded to the "smooth" strains described by Pittman (1931).[6] We did not employ a boiled-blood medium in our work. Since the investigation at the Royal Hospital School was completed, we have been able to study "smooth" and "rough" strains kindly supplied to us by Dr. Pittman, and have found that they are as readily distinguishable, as regards colony form, on Fildes' medium as on boiled-blood agar. We should have included her "roughs" among our typicals. It is our impression that few if any of the strains we isolated would have conformed to her "smooth" type, and we are confident that strains of this type were not numerous. During the past six months we have carefully examined strains of *H. influenzæ*, isolated from schoolboys and adults, from this point of view, and have only observed four "smooth" strains among several hundreds examined.

THE POPULATION SAMPLED

The school population of 775, aged 11½–15½ years was divided into nine companies; the boys in each company slept in one large dormitory, but all met for meals in the common dining hall and in class. The sample selected for the routine swabbing was Company 5, consisting of 95 boys, the requisite number (105–110) being made up with boys from Company 6.

HISTORY OF THE EPIDEMIC

The school reassembled on Jan. 6th, and on Jan. 15th the first case occurred, followed the next day by 12 further cases. The epidemic rapidly reached its peak, 48 boys reporting sick on Jan. 20th; the decline was rather more gradual, but by Feb. 4th the epidemic was virtually over. There were in all 238 cases (attack rate 30·7 per cent. on the whole school population)—151 during the week ending Jan. 21st, and 59, 20, 5, and 3 during the subsequent four weeks.

No company escaped the disease entirely, but the attack rates varied between 16·8 and 47·2 per cent. The following Table shows the attack rates for each company separately:—

TABLE I

Company.	No. in company.	Cases.	Attack rate per cent.	Company.	No. in company.	Cases.	Attack rate per cent.
1	98	28	28·6	7	88	37	42·0
2	93	40	43·0	8	76	16	21·1
3	86	20	23·3	9	71	18	25·4
4	72	34	47·2				
5	95	16	16·8	Total	775	238	30·7
6	96	29	30·2				

We are indebted to Surgeon-Captain May for the following notes on the clinical aspect of the disease:—

The type of case was of a mild appearance, sudden onset with pyrexia (temperature 100°–103°), frontal headache, and a general feeling of malaise; in a few cases vomiting ushered in the attack and most of the boys complained of slight sore-throat and general loss of appetite; some complained of general pains in the limbs but this was not common. The clinical signs were few and little could be seen in the throat; in one or two cases there was slight enlargement or fullness of the submaxillary and cervical glands. Cough was general and due to faucial irritation; physical signs in the chest nil. Under treatment and confinement to bed on a low diet the temperature fell to normal in two or three days, and recovery was speedy. There were two cases of mild bronchitis and one transient case of pneumonia who made a rapid convalescence; there were no cardiac or middle-ear complications.

THE NASOPHARYNGEAL FLORA IN RELATION TO THE EPIDEMIC

The bacteriological findings are summarised in Tables II. and III.

TABLE II

Date of exam.	Boys examined.	Percentage carrier rate. Pn.	H.S.	Pf.
1932.				
Oct. 19	105	57·1	54·3	61·8
Dec. 7	112	54·5	21·4	80·4
1933.				
Jan. 17–27	*152*	*68·4*	*38·2*	*79·9*
Feb. 1	102	67·6	42·2	81·4
Mar. 20	100	52·0	40·0	84·0

Pn. = pneumococci; H.S. = hæmolytic streptococci; Pf. = Pfeiffer's influenza bacilli. In Tables II. and III. figures in italic apply to influenza cases.

The swabbings of 19.x.32, 7.xii.32, 1.ii.33, and 20.iii.33 were successive swabbings carried out on a normal sample of the population, though the February and March figures include some boys who had passed through an attack of influenza in January. The swabs, grouped under the dates 17–27.i.33, were taken from boys ill with influenza. They, for the most part, were not the same boys as those swabbed on earlier and later dates. As stated above, our normal sample for repeated swabbing was drawn in the main from one company (No. 5) which happened to show a relatively low attack rate, while the cases of influenza were scattered throughout the school.

The figures need little comment. The total carrier rate of *H. influenzæ* showed no significant fluctuation in association with the influenza epidemic. It had risen from 61·8 to 80·4 per cent. between Oct. 19th and Dec. 7th, but the figures for December, February, and March are almost identical with each other and with the percentage isolation of influenza bacilli from the boys ill with influenza in January.

The figures set out in Table III., in which any boy carrying more than one type of influenza bacillus is included in each of the appropriate groups, show that in the epidemic and post-epidemic periods typical strains were more frequent than during the Christmas term. It will be noted that the frequency of typical

strains among actual cases of influenza in January and among the school population as a whole some ten days later are practically identical. The same is true, to a rather less extent, of the indol-positive strains, though here the actual cases are more clearly marked off from the general school population at a slightly later date.

TABLE III

Percentage carrier rates of different varieties of H. influenzæ (Pfeiffer's bacillus)

Date of exam.	"Typical."	"Atypical."	Indol+	Total
1932.				
Oct. 19	49·4	21·9	44·8	61·8
Dec. 7	37·5	54·5	38·4	80·4
1933.				
Jan. 17–27	*70·4*	*18·4*	*57·2*	*79·9*
Feb. 1	67·6	38·2	48·0	81·4
Mar. 20	61·0	46·0	49·0	84·0

There is a suggestion, which is in conformity with previous findings, that the prevalence of clinical influenza is associated with an increased frequency of morphologically typical and of indol-producing strains of *H. influenzæ*; but clearly the association is not of a kind to lend any significant support to the view that these strains, as here defined, are the primary cause of the infection.

As regards the pneumococci, it will be noted that they were more frequent in the influenzal cases and in the immediately post-epidemic period than in earlier or later swabbings, but there is no evidence of the sharp and significant rise during the immediately pre-epidemic period that was noted in Manchester.[1]

The fluctuations in the hæmolytic streptococci are irregular. The carrier rate of October, 1932, is unusually high, and was associated with an outbreak of tonsillitis and some cases of acute rheumatism in the school. It fell sharply at the end of the Christmas term, rose again in association with the influenza epidemic and remained relatively high.

The observed fluctuations in the carrier rates are not wide, but taking the findings as a whole they suggest that the bacterial flora of the nasopharynx is affected by influenzal infection, typical influenza bacilli, pneumococci and perhaps hæmolytic streptococci becoming more frequent or more numerous in an individual. They would seem, however, to accord better with the view that this disturbance is the result of a specific infection due to some other organism, probably, in view of recent work, with a filtrable virus, than with the view that the influenza bacillus, or one of its more pathogenic variants, is the primary cause of the disease.

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MEDICINE AND THE LAW

The Forensic Value of Blood Tests

IN a case recently reported[1] from Germany, sentence of 20 months' imprisonment was passed upon a woman for perjury in the course of affiliation proceedings. The evidence was that of blood-group findings, tested several times. She herself and the putative father against whom she was claiming both belonged to the same blood group, the child to another blood group. Doubtless the evidence also included denials by the putative father, but the scientific results of the blood tests seem to have been accepted as conclusive. In affiliation cases in England there has sometimes been a reference to the possibilities of blood-group evidence, but no instance of reliance thereon has been reported. Mistrust of the expert witness is deep-rooted. A characteristic early instance, often quoted, occurred at the murder trial of R. *v.* Nation at Taunton assizes in 1857. A stained knife was found on the prisoner at his arrest. He said the stains were caused in cutting some beef. Scientific evidence for the prosecution showed that coagulation had taken place upon the knife-blade and therefore that the stains were living blood; also that the relative sizes of the corpuscles agreed with that of human blood and not with that of the blood of ox, sheep, or pig. Lord Chief Justice Cockburn advised the jury not to convict upon this "scientific speculation" alone. The witness had shown them the "marvellous powers of the modern microscope," but "they were coming to great niceties indeed when they speculated upon things almost beyond perception." If modern judges have acquired a better respect for science, juries often remain unimpressed by technical evidence. Not long ago at the Worcester City Sessions a man charged with housebreaking said he had been at home all night; the prosecution proved that finger-prints on the window of the entered premises were those of the accused, a superintendent of the Birmingham C.I.D. showing that the prints bore 23 distinctive ridge characteristics. The superintendent said there had never yet been a mistake in finger-print identification. The jury, however, found the prisoner "not guilty."

In a case this week at Chatham a man against whom an affiliation order has been made has prosecuted the mother for perjury. The case stands committed to the Kent assizes. A newspaper forecast announced that an application would be made for a blood-test. This may be merely the preliminary skirmishing which has occurred in similar proceedings before. Perhaps it means that the prosecutor will be asked in the witness-box whether he consents to a test; if he does, it remains to be seen what arguments of its conclusiveness will be addressed to the court.

An obvious difficulty of making full use of blood-group evidence in England is one which may not exist in continental countries. Here even the taking of a suspect's finger-print impressions is restricted by careful regulations; the taking of a sample of his blood would amount to an unjustifiable assault unless he gave permission or unless Parliament alters the law. Affiliation proceedings in this country are only quasi-criminal; compulsory blood tests are out of the question. The test is useless unless both parties consent to undergo it; the solicitors advising either party would probably hesitate to risk consent to a technical test which might give negative or adverse results. If an advocate on behalf of the mother of an illegitimate child were to lay stress on the refusal of the putative father to have his blood tested, the comment would be allowed little weight by the magistrates. The rules of the game favour the defendant; unless a prima facie case is made against him, he has nothing to answer.

The absence of compulsion is also a difficulty in applying the suggestion made by Mr. W. McAdam Eccles in a recent letter to the *Times* (Jan. 16th) advocating blood tests for motorists charged with being under the influence of drink. From a single drop of blood, he says, taken at the time of arrest and sealed in a small tube, there can be estimated the

[1] Münch. med. Woch., Dec. 29th, 1933, p. 2050.

actual percentage of alcohol then circulating in the blood; so small a percentage as 0·1 may produce such symptoms as to show a person to be "under the influence of drink." The determination, he continues, is not easy but it is accurate; "any objection to the test, which can be carried out within a few hours, almost makes the objector self-convicted." But something which "almost" proves a case is not enough for judicial purposes. Indeed, unless the method makes allowance for the different effect which the same amount of alcohol has upon different people, magistrates would in any case be likely to regard the test as inconclusive.

Alleged Ptomaine Poisoning from Gorgonzola Cheese

In Shearing *v.* Pullman Car Co. last week a young woman obtained £375 damages in respect of ptomaine poisoning contracted, as she alleged, by eating a Gorgonzola cheese sandwich supplied by the defendants. She travelled down one night from Charing Cross to Bexhill, ordered coffee and the sandwich on the train and went to bed without eating anything more. Next morning she was ill and for several weeks was incapacitated from work. Her medical attendant, Dr. Samuel Martyn of Cooden Beach, gave evidence; he attributed the poisoning to the cheese. Asked in cross-examination if Gorgonzola was not a very acid cheese unfavourable to the growth of bacteria, he said he was unaware of it; ordinary "ripe" cheese was not harmful but might be contaminated by flies. Dr. G. M. Slot, also a witness for the plaintiff, said infection from cheese was not uncommon. On the other side Dr. Lionel Whitby, senior bacteriologist at Middlesex Hospital, stated that a search of the records of cheese-poisoning since 1887 had failed to reveal a single case due to Gorgonzola; he thought Miss Shearing's illness might be attributed to some preserved tongue sandwiches eaten earlier in the day. Another passenger on Miss Shearing's train said he had eaten the Gorgonzola with no ill-effects and a Pullman car attendant described the arrangements for keeping the cheese (with meat, milk, butter, and other articles of food) in an ice-box. The judge said he was satisfied that there was no negligence on the part of the defendants, but the law obliged them to warrant that the sandwich was reasonably fit for human consumption. This warranty, he thought, had been broken; possibly the unusually hot weather at the time had something to do with it. It was a piece of bad luck and there was no reflection on the Pullman Car Co., but he held that the claim succeeded.

The British Celanese Fatalities

The inquest at Derby last week disclosed a new form of industrial poisoning. Employees in the experimental department of British Celanese Ltd. at Spondon are found to have lost their lives through inhaling poisonous fumes in their work at the tank. There are other specialised forms of statutory inquiry by official experts into particular classes of accidents (for example, under Section 22 of the Factory and Workshop Act) or into disasters occurring in particular industries; but, over these forms of departmental inquiry, the inquest has at any rate one advantage, namely, the coroner's power to order a post-mortem examination. In the case investigated last week at Derby there were five men employed in the experimental work at Spondon. All died within a few weeks of each other about two months ago. The first two deaths were diagnosed as cases of gastric influenza; the symptoms caused no suspicion and the bodies were buried before there was any idea that death was due to any other than natural causes. Then the three further deaths followed and in addition there were seven other cases of non-fatal illness. The inquest related to the three later deaths, those of men named Gibson, Wade, and Sheldon, who were treated in the Derby Royal Infirmary.

The infirmary doctors, appreciating the identity of employment as well of symptoms, communicated with the coroner who ordered a post-mortem examination. This enabled Dr. Ernest H. Grey to state at the inquest that the deaths of Gibson (who was admitted to the infirmary on Nov. 21st and died the same day) and Wade (who was admitted on the 22nd and died on the 25th) were due to acute hæmorrhagic nephritis. In the case of Sheldon Dr. Francis Sheehan said that his post-mortem examination showed death to be due to acute toxic nephritis associated with hepatitis; the cause of death in all three cases was practically the same; the symptoms, where developed, were attributable to toxic and chemical poisoning. Mr. R. Moncrieff, chemist to British Celanese, gave evidence that the dead men had for some months been employed in the experimental department; up to the moment of their illness nobody had been affected so far as was known. Many chemicals were used, one of them a derivative of ethylene glycol. During October an alteration was made in the chemical tank over which the men worked; the result was to shorten their hours but to intensify the fumes. Since the deaths the whole of this process had been stopped and it would not be resumed until the Home Office had given its decision. Meanwhile every man who had been engaged in this work had been medically examined. Apart from Home Office approval and regulations, added Mr. Moncrieff, steps had been taken to see that, if this plant were operated again, there would be a suction-exhaust of the atmosphere around the tank before any workman was allowed to approach it. These experimental processes being a commercial secret, part of the inquest was held in private; the Home Office experts, however, have of course been allowed to take all such samples as were required. Dr. S. A. Henry, one of the Home Office factory inspectors, gave evidence of official experiments with the chemicals concerned. He considered one ingredient might be the cause of the deaths; some derivative of ethylene glycol was in his opinion under grave suspicion. The coroner, in summing up, pointed out that for months before Nov. 20th the management of British Celanese had no reason to suppose that anything was wrong. The jury returned a verdict that the deceased met their deaths as a result of inhaling the fumes during their employment; in the jury's view the deaths were accidental.

The verdict of accidental death prevents any question of criminal liability; it does not preclude further discussion of civil liability, but it was stated that compensation had been paid, through the men's trade-union, to the widows and children. As for the future, the Home Office has full powers under Section 79 of the Act to certify a process to be dangerous and to make regulations to meet the necessity of the case. Ethylene glycol itself is a dihydric alcohol which boils at 197° C. Intermediate in nature between ordinary alcohol and glycerin it is unlikely to be toxic unless its vapour is inhaled over a long period. One question to be decided is what class or classes of its derivates are dangerous. As is well known, codes have been prescribed for more than thirty dangerous trades with good results. The story made public at Derby recalls other discoveries of industrial perils—such, for instance, as were unex-

pectedly encountered in applying luminous paint to watch dials or in the various risks run by munition workers during the late war. Unhappily, as at Spondon, the lessons are seldom learnt without prior loss of life to the workers.

REPORT OF THE DEPARTMENTAL COMMITTEE ON STERILISATION[1]

THE Departmental Committee on Sterilisation has found itself able with complete unanimity to present a number of far-reaching and, as many will think, boldly conceived recommendations which are summarised below :—

RECOMMENDATIONS

(1) Subject to the safeguards proposed, voluntary sterilisation should be legalised in the case of :—

(*a*) A person who is mentally defective or who has suffered from mental disorder;

(*b*) A person who suffers from, or is believed to be a carrier of, a grave physical disability which has been shown to be transmissible ; and

(*c*) A person who is believed to be likely to transmit mental disorder or defect.

(2) Before sterilisation is sanctioned in the case of a mental defective, care should be taken to test his or her fitness for community care.

(3) Mental defectives who have been sterilised should receive the supervision which their mental condition requires.

(4) The operation of sterilisation should only be performed under the written authorisation of the Minister of Health, in regard to which the following procedure should apply :—

(*a*) Application for the authorisation should be supported by recommendations in a prescribed form signed by two medical practitioners, one of whom should, if possible, be the patient's family doctor and the other a practitioner on a list approved by the Minister. No medical practitioner should sign a recommendation unless he has examined the patient.

(*b*) The Minister, on receipt of the recommendations, should be empowered to require any necessary amendment of the forms and to cause the patient to be specially examined if it is considered advisable.

(*c*) In order to deal with difficulties that may arise in connexion with applications on behalf of persons suffering from, or believed to be carriers of, inherited disease or disability, the Minister should be empowered to appoint a small advisory committee consisting partly of medical practitioners and partly of geneticists to whom doubtful cases could be referred.

(*d*) The hospital authorities or (in the case of operations performed elsewhere) the operating surgeon should be required to notify the Minister when the operation has been performed.

(*e*) In all cases in which the patient is capable of giving consent he should sign a declaration of willingness to be sterilised, and one of the two medical recommendations should include a statement that the effect of the operation has been explained to the patient and that in the medical practitioner's opinion he is capable of understanding it. If the practitioner is not satisfied that the patient is competent to give a reasonable consent, the full consent and understanding of the parent or guardian should be obtained. If the applicant is married, he or she should be required to notify the spouse of the application.

(*f*) In the case of persons who have suffered from mental disorder, sterilisation should not be permitted without a recommendation from a competent psychiatrist, who should be required to certify, after examining the patient, that, in his opinion, no injurious results are likely to follow.

(*g*) In dealing with cases of mental defect and of mental disorder, the Minister of Health should exercise his functions after consulting the Board of Control.

(*h*) The procedure should at all stages be treated as strictly confidential.

(5) Medical practitioners, in making recommendations for sterilisation, should have protection similar to that accorded to them in respect of certificates given under the Lunacy and Mental Treatment Acts.

(6) The operations for sterilisation which are recommended are vasectomy in the case of males and salpingectomy in the case of females. The latter operation should only be performed by a surgeon competent to deal with any morbid condition which he may find.

(7) The operation of vasectomy should not be authorised in the case of any person who has not reached physical maturity, pending the results of the further research recommended in this connexion.

(8) The operation for sterilisation should not be performed in a mental hospital or mental deficiency institution.

(9) In the case of persons unable to pay the full cost of the operation, the cost (including the expense of the medical recommendations) should be borne by the mental deficiency authority in the case of mental defectives, by the visiting committee in the case of persons suffering from mental disorder, and by the public health committee in the case of persons suffering from transmissible physical disorders, subject to the right of the authority to recover from patients or relatives so much of the cost as is reasonable. In all cases, however, where the cost falls upon local funds, the local authority should have the right to require the patient to enter a municipal hospital or any voluntary hospital with which they may have made arrangements for such cases.

(10) In addition to the research mentioned in (7) above, further recommendations for research are made which do not permit of presentation in a summarised form.

These recommendations are based upon data obtained by the committee from many sources. Inquiries were addressed to the Governments of those countries in which sterilisation laws are about to be or have been enacted, and these laws are set forth in full in an appendix. The committee further interviewed 60 witnesses, representing many different points of view. The evidence submitted by some of these is presented, either in full or in abstract, in six appendices. An original inquiry was, moreover, instituted into the children of mental defectives.

The Children of Mental Defectives

Hitherto investigations into the genetics of mental defect have proceeded from the propositi (i.e., in this case mentally defective subjects) to their ascendants, and various estimates have been given of the extent to which abnormal conditions occur among these. The inquiry here undertaken moved in the opposite direction and throws a more vivid light upon the essential genetic problem of defect. The total number of defectives reported on was 3733. These defectives produced 8841 children, of whom 2001 had already died. The percentage (22·5) of deaths is striking, and confirms the conclusion drawn from other evidence that the mortality among defectives and the offspring of defectives is abnormally high. The 6840 children who survived were divided into the three following age-groups : 0 to 6 years, 7 to 13 years, and over 13 years. In regard to the children between 7 and 13 years, it was found that 14 per cent. were defective, 31 per cent. were retarded, 52 per cent. normal, and 3 per cent. superior. In regard to the children over

[1] H.M. Stationery Office. Cmd. 4485. 2*s*.

13, it was found that 37 per cent. were mentally defective, 12 per cent. were retarded, 51 per cent. normal, and none superior. The striking difference in the comparison of those over 13 with the 7 to 13 class lies in the number of those previously reckoned as retarded who are later classified as mentally defective. The latter group has risen from 14 per cent. to 37 per cent. In an appendix Prof. R. A. Fisher says: "It would seem that a number of children who are later to be regarded as mentally defective or retarded are considered to be normal in the first seven years of their lives, and that many who are later to be classified as mentally defective are, until their fourteenth year, still placed in the retarded group." The investigation further yielded the interesting fact that of 3247 mentally defective women known to the local authorities to have had children 66 per cent. were unmarried. This finding illustrates that the legal prohibition of marriage for defectives would constitute but an incomplete solution of the problem of limiting their fertility.

Causation of Mental Defect and Disorder

The report contains chapters on our present knowledge of the causation of mental defect and disorder. In regard to mental defect, the chief conclusions are that: (1) in many cases there exists in the family some form of mental abnormality such as insanity, psychoneurosis, epilepsy, defect, or dullness. In the majority of such cases there is evidence of heredity, but the mode of transition is at present unknown; (2) low-grade mental defect is more frequently associated than is high-grade with environmental factors and it appears to be fairly equally distributed among all classes of society; (3) high-grade mental defect occurs proportionately more frequently in the lowest social stratum than in the rest of this population. (It is regarded as possible that the bad environment prevalent in the social problem group and the assortive mating which there takes place may contribute to this result.)

In regard to mental disorders, it is stated that, apart from Huntington's chorea and myoclonus-epilepsy, there is no conclusive evidence that inheritance follows mendelian ratios; whereas in general psychopathic parents tend to have psychopathic children, the view that familial mental instability is usually progressive and tends to become more severe in each succeeding generation, thus conforming to the so-called "law of anticipation," is not confirmed; and manic-depressive insanity and schizophrenia appear to show markedly higher familial incidence than other types of mental disorder which are of frequent occurrence.

Other findings of importance are that the fertility of mental defectives is, on the whole, probably below that of the average of the population. At the same time, the committee found evidence from Nottingham, Liverpool, and London that the families *from which defectives come* are larger than average families in the same locality.

IRELAND

(FROM OUR OWN CORRESPONDENT)

ANOTHER "CUTS" BILL

THE text of the Local Services (Temporary Economies) (No. 2) Bill, 1933, was circulated a few days ago. It gives powers to the several local authorities to make deductions during the year 1934 from salaries paid to their officers and from certain scales of expenses. The deduction shall be such as the local authority shall in each case think proper, but shall not be less than the minimum deduction laid down in the schedule to the Bill for such a salary nor more than shall be sanctioned by the Minister. The minimum deductions stated in the schedule are similar to those laid down in the Act passed last year dealing with the salaries of civil servants. No deduction is to be made from a salary which does not exceed £300 a year. The minimum deduction on a salary which does not exceed £400 is to be 2 per cent., and a rapidly increasing scale will apply to the higher salaries. Medical officials as well as their colleagues will suffer under the Act, but a special concession is to be made in the case of dispensary medical officers—the salary shall be taken to be £50 per annum less than the actual amount thereof. The remuneration of comparatively few dispensary medical officers exceeds £350 a year, and therefore most of them will escape the operation of the cut. It will not be so with the whole-time medical officers, such as medical officers of health and the medical officers in mental hospitals. A salary of £800 a year, for example, will suffer a minimum deduction of £24.

Although the Bill was introduced to the Dáil in November there were rumours that it would not go any further. It is generally admitted that the "Cuts" Act of last year, dealing with the salaries of civil servants, has not brought about any real economy. In fact the deductions have been more than counterbalanced by the pensions that have had to be granted to a large number of civil servants who had statutory rights under the treaty. The Government has announced that there is no intention to continue the Act this year, and it is surprising to find them proposing to apply to local officials a policy which has failed to produce any useful result when applied to the civil service. The net result in each case is much unrest and disquietude in the services, the members of which see that their security of contract no longer holds. In one particular the present Bill is more harsh than its predecessor. It states a *minimum* deduction, the maximum being at the will of the local authority subject to the discretion of the Minister. In the previous case there was a fixed scale.

THE CHIEF MEDICAL OFFICER

It is just over a year since Mr. Edward Stephenson relinquished the office of chief medical officer to the Department of Local Government and Public Health, and a certain amount of speculation had taken place over the delay in appointing a successor. The Minister took the unusual course of referring the appointment to the Civil Service Commission, which advertised the vacancy and called in the assistance of a selection board. The appointment of Mr. Robert Percy McDonnell, F.R.C.S. Irel., is now announced. Mr. McDonnell had been acting as chief adviser during the interval since Mr. Stephenson retired. Mr. McDonnell was qualified in 1901, and at once went on active service to the South African War. On his return he engaged in private practice and was for a time assistant surgeon to St. Vincent's Hospital, Dublin. In the late war he served in Gallipoli, Serbia, and France as a captain in the Royal Army Medical Corps. In 1922 he held the rank of colonel in the Medical Service of the Irish Free State Army. For several years he has been an inspector in the Department of Local Government and Public Health. His appointment will give pleasure to the medical profession in Ireland, particularly to those in the public services. His experience in practice and in administrative work has given him a wide knowledge of medical affairs, while medical officers have always found him a capable and sympathetic official.

CORRESPONDENCE

ADENOID AND TONSIL OPERATIONS

To the Editor of THE LANCET

SIR,—We owe Mr. T. B. Layton a debt of gratitude for ventilating the question, "What can we do to diminish the number of tonsil and adenoid operations?" I think most laryngologists agree that there are a great number of unnecessary operations carried out, and if Mr. Layton's article has an effect in reducing the number he has done a great service to the community. In properly selected cases it must be admitted, however, that no operation in surgery is followed by a larger percentage of gratifying results.

In most of the discussions of this question the term tonsil operation is employed. I have headed this letter "Adenoid and Tonsil operations" as I consider, in young children at any rate, treatment of the adenoid hypertrophy, when present, is what matters most—the tonsils in many instances may be left to look after themselves. The reason why operation is not followed by beneficial results frequently lies in the fact that the adenoids have not been adequately dealt with. I am quite often asked to see children on whom the tonsil and adenoid operation has been performed, when nasal obstruction, the tendency to frequent colds, or to deafness persists. The reason in many cases is not far to seek. One finds on examination that, although the tonsils have been successfully removed, there is still a considerable, or even a large mass of adenoid tissue present in the nasopharynx. If an interval has elapsed since operation and if the symptoms attributable to adenoids are recent the charitable explanation that the adenoids have grown again is generally forthcoming. I am certain, however, that in many such cases the adenoids have never been properly removed. If adenoids are properly cleared away recurrence even in young children is probably very infrequent. In many clinics it is thought that adenoids can be dealt with by one sweep of the curette. I am convinced that this is impossible and I have for many years employed a special small curette which is used after the main mass has been removed with the ordinary curette. This is inserted into the choanæ so as to remove remnants of adenoid tissue lying too far forward to be accounted for by the ordinary instrument. This small curette is also made use of to thoroughly clear away all lateral adenoids in the region of the eustachian tubes.

Another reason for the non-success of operations is the fact that suppuration in one or more of the accessory sinuses, usually the antrum, is overlooked. Transillumination and even X ray examination are not always sufficient for the investigation of such conditions, but so far as the antrum is concerned proof puncture is reliable, and this may be carried out at the same time as the operation on the adenoids. In the ordinary routine of hospital out-patients how often is this procedure employed in the case of children? Lord Dawson draws attention to changes in the soft palate following tonsillectomy. Seldom are these changes so marked that they interfere with function. Occasionally severe damage to the palate may result from clumsy operations performed by novices; Mr. Layton must have been unfortunate if he has met with many cases of "post-operative impairment of function." He maintains that the operation "has a greater number of complications to life . . . than any other operation of the same magnitude." It may be a danger to the public for some people to drive a motor-car or for others to perform a tonsil and adenoid operation. Surely in the hands of those possessing an average amount of skill—and this remark applies perhaps more to the anæsthetist than to the operator—serious complications, immediate or remote, are so rare as to be almost negligible. Notwithstanding Mr. Layton's statement many will agree that there are some cases of rheumatism and nephritis, especially in children, associated with hæmaturia, where removal of the tonsil is followed by almost miraculous results.

I quite agree with Mr. Layton that the term "enlarged" tonsils should be discarded. Hypertrophy in itself must only in rare instances call for operation, but cases do occur when the tonsils occupy so much space in the pharynx that they interfere with function. If there is a large mass of adenoids as well the condition is aggravated.

Mr. Layton rightly objects strongly to the term "typical adenoid facies," a highly unscientific use of words no doubt, even if such a "facies" did invariably indicate the presence of adenoids. It cannot be denied, however, that adenoids do cause changes in the countenance. Mouth breathing, admittedly, is frequently a sign of nasal obstruction, and removal of that obstruction will allow of a possible return to nasal respiration. Theories, like politics, are subject to rapid change, and it is improbable that the last word has been said with regard to the causation of the so-called adenoid facies or that any theory so far put forward in explanation is either entirely erroneous or absolutely correct. Mr. Layton states that the tonsil "is a lymph-gland differing only from the other lymph-glands "by its anatomical relationships." He further states "if we know not its function we do not know the function of the other lymph-glands. The principles which govern the surgery of these apply also to the tonsils." Even if one agrees with these statements—and I certainly do not agree with them—and if one leaves out the question of function, about which we know practically nothing, the difference in anatomical relationships makes all the difference. I should say that there is little analogy between the diseases of the tonsil and the surgery of that organ, and the diseases and the surgery of the lymph-glands. The close association of the tonsil with the septic cavity of the mouth means that it runs a continual risk of becoming infected. The tonsillar crypts and recesses greatly increase this risk as they form harbours and breeding grounds for a multitude of bacterial flora found in and passing through the mouth. Of all the lymphatic structures in the body the tonsils lying at the entrance to the alimentary canal are probably the most vulnerable parts of the whole system. There is one peculiarity of the lymphoid tissue residing in the neighbourhood of the pharynx—namely, that it is not subject to secondary deposits from malignant tumours in the neighbourhood of lymph-glands.

I entirely agree with Mr. Layton that the operation of tonsillectomy should not be lightly undertaken. Mature consideration and consultation with one versed in general medicine should form a prelude to any surgical procedure. The rush of a hospital out-patient department is prejudicial in the extreme, but in private practice there is no excuse for hasty decisions followed perhaps by rash promises as to the benefit resulting from operation. The practice of engaging a laryngologist to slaughter at sight large numbers of tonsils which have been beaten up by some over-enthusiastic practitioner is one of the most deplorable examples of mechanised medicine one can

imagine. I believe, however, such a procedure is not without its exponents.

I do not agree with Mr. Layton in his view regarding the so-called lingual prolongation. It is unfortunate that the term has been applied to the lower part of the tonsil. This portion should, I think, be removed in every case. It is not in any way part of the lymphoid tissue at the base of the tongue, and I cannot see how the loss of this lowest part of the tonsil is "fraught with grave consequences to hearing."

I am, Sir, yours faithfully,

NORMAN PATTERSON.

Harley-street, W., Jan. 22nd, 1934.

To the Editor of THE LANCET

SIR,—There are many who will agree with Mr. Layton's contention that tonsillectomy is too frequently performed, and there is no doubt that there are cases which by suitable medical treatment can be so much improved as not to require an operation. Everyone will agree with him that tonsillectomy should not be undertaken when there is infection about, whether it be measles, erysipelas, or scarlet fever, and it is to be hoped that the barbarous practice of operating in the morning and sending the little patient home in the afternoon will soon be abolished.

Injury to the palate should certainly not occur in children, but a certain amount of impairment of palatal movement of a more or less temporary character may occur in adults where the tonsil is very large and adherent from repeated inflammation—surely an indication that the operation should have been performed at a much earlier date. Again Mr. Layton claims that the same surgical principles should be applied in dealing with the tonsil as any other lymph gland; but the best and under certain circumstances the only treatment for a diseased lymph gland is removal. I agree it is not absolutely necessary to remove the tonsils, any more than it is absolutely necessary to extract a carious tooth, but it is not a case of necessity but of advisability.

The ten minutes devoted to the child and the five to the parent should be reversed. The latter is better able to endure the ordeal.

I am, Sir, yours faithfully,

G. W. DAWSON.

Devonshire-place, W., Jan. 22nd, 1934.

USE OF SEDATIVE DRUGS BY MIDWIVES

To the Editor of THE LANCET

SIR,—Your annotation last week (p. 140) mentions the exchange of view between the Central Midwives Board and the General Medical Council about the advisability of midwives using certain drugs in the course of a confinement. Midwives may be called on to induce analgesia when attending (1) cases on their own responsibility, (2) cases in the labour ward of a hospital, (3) doctors' cases in the absence of the doctor. Each year some 300,000 women are attended by general practitioners, including in that number the growing proportion who go to hospital; the remaining 450,000 or so are attended by midwives alone. Either midwives themselves must be permitted to administer an anæsthetic to these patients, or the services of an anæsthetist must be provided, for women are rightly demanding relief from their distress. To obtain the services of an anæsthetist in every case would mean that practitioners would have to attend about double the number of cases they do now, and to give a good deal of time to maternity anæsthetic work, or there would have to be full-time maternity anæsthetists. As either of these events is unlikely, it follows that midwives themselves will have to give anæsthetics.

This could, in my opinion, easily be arranged in urban and suburban areas; and even in the country districts the difficulties are not insuperable. We have in our "district nurses" an exceptionally capable body of women; but many of the nursing associations are small and their nurses widely scattered. If a number of nursing associations would amalgamate and pool their resources, each such large district could engage 8–10 nurse-midwives, of whom (say) two could be specially trained to give anæsthetics under the general supervision of a medical man experienced in anæsthetic work. As to what anæsthetic would be most suitable for a midwife to use opinions are divided, but experience tends to show that some form of nitrous-oxide analgesia and anæsthesia is preferable to any other. With the present excellent hire service of cylinders there are few parts of this country which could not be supplied with the necessary gases; modern machines for administration are portable and sold at a reasonable price. The only heavy part of the apparatus is the cylinder, and the relatives of the patients might be required to fetch these from some central point. A gas fee of 5*s*. per case would cover expenses. In a country district, chloroform could be administered by means of a Junker's inhaler or capsules, and as time goes on and more perfected technique comes into use it will, I think, be found that some combination of sedative drugs with nitrous oxide or chloroform will give satisfactory results in all cases.

The position in hospital is a little different. Many women are now going to municipal maternity hospitals for their confinements, and more are likely to do so in the future. The London County Council reported favourably on a recent experiment in which light anæsthesia was provided for some 3700 patients delivered in their hospitals. This necessitated the provision of full-time anæsthetists, and less wealthy councils may not be so willing to go to this expense. The difficulty could be overcome by the use of nitrous-oxide analgesia with an automatic intermittent flow machine which could be left to the nurse to manage. In private practice it was the custom in the past to give relief with light chloroform anæsthesia, given by means of a mask and drop-bottle. But chloroform has somewhat fallen into disrepute, and practitioners do not, it seems, make use of nitrous oxide owing to the belief that it will take up too much of their time. The employment of an automatic machine which the patient can herself use under the supervision of the midwife in the doctor's absence would overcome this difficulty.

I am, Sir, yours faithfully,

New Barnet, Herts, Jan. 19th, 1934. JOHN ELAM.

THE NATURE AND PURPOSE OF CERTIFICATION

To the Editor of THE LANCET

SIR,—In explaining the procedure of certification, it is of very great importance that the public should understand that it was the intention of the Lunacy Act, 1890, that certification should be a bulwark for the protection of the subject, and that without a judicial order it is not legal to imprison anyone. Before making this order, the magistrate who commits the individual is intended to make very careful investigation into whether he is dangerous and unfit to be at large. It is imprisonment that causes "stigma," and not the provision of legal safeguard. If so-called mental hospitals were really run on a hospital footing, patients would not hesitate to enter them as they enter the Lady Chichester Hospital at Brighton. There they are not imprisoned, and are

not placed under the Lunacy Board. Hence there is no stigma, and a very large number recover, without any necessity for detention. It is in the starting of such hospitals all over the country that the best hope for the future lies. It would also be an immense saving, when compared with the huge paraphernalia for detention.

Dr. Ernest Jones, in his lecture reported in THE LANCET of Jan. 6th, points out very cogently that of late years far less stress is laid on static lesions, and far more on understanding "the active processes of the mind—the motivation, purposes, and tendencies that produce a particular mental attitude or reaction." This view of the patient is especially characteristic of homœopathy, where interest centres on the patient himself and his peculiar individual make-up, rather than on the disease with which he is supposed to be afflicted. I have been an astonished witness of the results of homœopathic out-patient practice in the mental sphere.

I am, Sir, yours faithfully,

S. E. WHITE, M.B., B.Sc.

Manor Park, E., Jan. 15th, 1934.

*** The causes for the "stigma" are, in our opinion, more complicated than Dr. White allows. After all has been done that can be done at the hospital quoted, some patients' conduct is too abnormal for them to remain there and certification is resorted to. The guardian rôle of the public mental hospitals under the Board of Control, which was the subject of the leading article to which Dr. White refers, cannot fairly be described as imprisonment. The hospitals aim at treatment and not at detention. —ED. L.

THE PREVENTION OF CANCER

To the Editor of THE LANCET

SIR,—Dr. Cramer's figures do not support his view, which I had previously shared, that the varying degrees of susceptibility among the "cancer population" have any significant influence on the problem of prevention. If it could be shown that there is a markedly higher total incidence among workers exposed to occupational cancer, it would go far to support his belief, but his investigations seem to show the contrary.

He looks upon cancer of the stomach as similar to an occupational disease, and finds that in England its incidence is only 22·2 per cent. of the total cancer mortality, whereas it reaches 55·5 per cent. in Holland. We should expect to find the incidence of cancer of other organs somewhat lower in the latter country, for some people who would have developed cancer elsewhere have already succumbed to the gastric disease. My point is that we might also hope to find the total incidence lower among the English, who are less often attacked by cancer of the stomach, but Dr. Cramer gives the total cancer mortality at exactly the same figure for both countries; in Bavaria the total cancer mortality is even slightly lower, although the share of gastric cancer is as high as 55·8 per cent. If we accept these figures, I do not see how to avoid the conclusion, which I stated in my letter of Jan. 13th, that all susceptible persons are sooner or later affected, and that, if hygienic measures have the effect in Holland of reducing the number of those attacked by cancer of the stomach, the total incidence of cancer will nevertheless not be reduced.

I agree with Dr. Cramer that it would be of great interest to find out how many people cured of cancer develop the disease in some other site, and to compare this frequency with that of the rest of the population. As he says in his paper, this would indicate whether or not susceptibility is shared by all the tissues of an individual, and whether a previous cancer confers any measure of general immunity; but the point has not yet, so far as I am aware, been followed up. In the meanwhile, it is only possible to state that a patient cured of cancer is not rendered entirely immune.

I, too, in the present state of our knowledge, cannot imagine anybody not doing his best to avoid external carcinogenic conditions, but any hopes that such measures can reduce the total incidence of cancer are not supported by Dr. Cramer's statistics. However, the problem is fortunately not a simple one; there are doubtless many other factors which affect these figures, beside the incidence of cancer of the stomach, and I hope that the pessimistic outlook, imposed upon me by Dr. Cramer's paper, may not be permanent.

I am, Sir, yours faithfully,

HAROLD BARWELL.

Queen Anne-street, W., Jan. 20th, 1934.

ARTERIAL DISEASE OF THE EXTREMITIES

To the Editor of THE LANCET

SIR,—The letter from Profs. Telford and Stopford in your issue of Dec. 9th, 1933, recording ganglionectomy in nine cases of erythrocyanosis crurum puellarum frigida is of great interest and would be more so if they could record that the unsightly swellings of the lower two-thirds of the leg and the "heel-bumps" also disappeared after operation. It is this characteristic swelling of the leg which distinguishes this complaint from acrocyanosis and the sufferer is mainly concerned with one thing, viz., how to restore the elegance to her ankles. Her anxiety to achieve this will even drive her to a cosmetic surgeon for the thoroughly bad operation of excision of slices of the disfiguring blubber or to the orthopædic surgeon for the equally bad operation for removal of the heel-bumps.

I would assure Dr. Ingram (whose letter appeared in the following issue) that I am in no way confused about the ulcers of Bazin's disease and those due to breaking chilblains. The case for the tuberculous origin of erythema induratum has never been firmly established; if there were other embolic tuberculous manifestations which appeared every November and disappeared the following May, there would be something to say for the argument. The fact that the disease generally appears in young women also afflicted with tuberculous adenitis and with positive dermal tests does not prove that the disease is tuberculous. Further, practically all Bazin's ulcers will heal promptly under elastoplast strapping or after ganglionectomy. I am not aware that this is a characteristic of the tuberculides.

I am, Sir, yours faithfully,

A. DICKSON WRIGHT.

Wimpole-street, W., Jan. 16th, 1934.

ACUTE HEPATIC ATROPHY IN PULMONARY TUBERCULOSIS

To the Editor of THE LANCET

SIR,—In their interesting article (THE LANCET, Jan. 20th, p. 130) Drs. A. Lynn and J. S. B. Mackay say that acute hepatic atrophy or necrosis (I venture to substitute this for their "acute yellow atrophy"—which term, I suggest, has at length become really out of date) is as far as they know not associated with pulmonary tuberculosis. In an article entitled "Toxæmic Jaundice with Hepatic Atrophy in connection with Tuberculosis" (St. Bart.'s Hospital Reports, 1908, xliv., pp. 55–59), after describing

certain cases and literature bearing on the subject of atrophic and cirrhotic changes in the hepatic parenchyma in tuberculous subjects, I concluded:

"I think that one must add tuberculosis to the other possible occasional exciting causes of acute or subacute atrophy of the hepatic parenchyma, such as septic diseases of the abdominal viscera, abdominal operations for appendicitis, &c., pregnancy, chloroform-anæsthesia, constitutional (secondary) syphilis, phosphorus-poisoning, &c. In at all events the first of the cases above described, it seems probable that the pulmonary tuberculosis was an important factor in the production of the fatal icterus gravis and hepatic atrophy."

I have references to much scattered literature and some specimens in various museums more or less bearing on the subject, but I think I should come to the same conclusion to-day. I need scarcely say that sanocrysin could not have been a cause of liver changes in 1908. There are some who believe that acute or subacute hepatic atrophy in early or secondary syphilis is always due to arsenical treatment, but salvarsan had, of course, not been administered in any of the cases up to 1908 that I summarised in the *Proceedings* of the Royal Society of Medicine (Path. Sect., 1909, ii., pp. 113–122).

I am, Sir, yours faithfully,

London, W., Jan. 21st, 1934. F. PARKES WEBER.

THERAPEUTIC PYREXIA

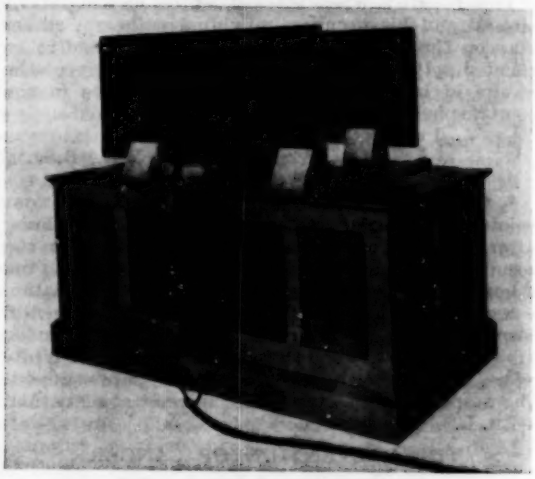
To the Editor of THE LANCET

SIR,—In an investigation of methods used for inducing artificial pyrexia I have lately visited Vienna and also New York and Chicago, where I saw something of the radiothermic apparatus introduced by Dr. Willis R. Whitney, working in the General Electric Company's research laboratories at Schenectady. Dr. Whitney observed that men in his laboratories who were constantly exposed to radiation had a temperature one or two degrees above normal. This led him to make experiments in which he was able to induce and control fever in animals, and eventually he devised the "fever machine" shown in the accompanying photograph.

Various methods of promoting fever have been tried in the past but they all have serious disadvantages. The use of hot water baths, for example, is hazardous because one is dealing with unknown factors and uncertain quantities. Exposure of the body to artificially heated atmospheres is time-consuming, inconvenient, and not easily controlled. The same objection may be raised to the injection of protein. Malarial inoculation, again, often fails because of the immunity of the patient, and it is dangerous because a living organism is introduced. The new short-wave high-frequency oscillating wave, on the other hand, is at all times under control and presents no difficulties if one has an efficient machine. As I have seen the American apparatus in daily use in the State Psychiatric Institute of New York there is no doubt in my mind that provided the patient is carefully prepared, the apparatus in perfect working order, and the case under constant and skilful supervision before, during, and after the actual fervescence, there need be no fear of accidents such as burns and scalds or of symptoms such as hyperpnœa, vomiting, or uncontrollable pyrexia. Apart from the discomforts of sweating and heat, the patients told me that they had no complaints; some of them even said that they looked forward to the treatment.

The equipment used is similar in principle to a short-wave radio transmitter, and is featured by a tube which oscillates the current at between 10 and 14 million cycles per second. This oscillating current is concentrated between two condenser plates instead of being fed into an aerial, and the body to be heated is placed between these plates (they will be seen projecting vertically from the top of the apparatus shown in the photograph).

The patient is dressed in a long pair of woollen combinations with woollen socks, and thick bath towels are wrapped round the chest, abdomen, and thighs to prevent sweat from forming pools which may give rise to scalds and blisters—the chief danger in the treatment. The patient is next wrapped round in blankets which are securely fastened by large safety-pins, so that no surface of skin is left uncovered except the head and neck. Being now fully prepared, he is laid prone on the frame of the



High-frequency heater for therapeutic use.

box (which is also blanket-covered) between the plates, a Celotex cover is placed over him, leaving the head outside, and the current is switched on. A hairdressers' blower is put to a hole at the foot of the cover and serves to circulate air within the box and so absorb excessive moisture. The patient is usually given water to drink, or a simple saline solution by mouth to counteract the loss of sodium chloride through perspiration.

The effect of the radiation is to produce heat within the tissues themselves, because of the electrical resistance of the body fluids, and apart from the treatment of general paralysis of the insane, in which I took most interest, it is applicable to other forms of infection. At the Fifth Avenue Hospital, New York, Dr. C. F. Tenney is using a small portable machine, made by the General Electric Co., in which the plates are fastened to movable arms so that local heat may be applied to any part of the body. In a communication to the New York Academy of Medicine on Dec. 8th, 1933, he spoke of favourable results obtained in pelvic inflammation, arthritis, pneumonia, bronchiectasis, and circulatory disease of the extremities. Some of these results he has already recorded.[1] He records that of 63 cases of arthritis 7 became symptom-free, 48 improved, and only 8 remained unimproved, and there have been equally good results in neuritis and syphilis (primary, secondary, and particularly tertiary). In cases of gonorrhœal infection radiothermy acts almost as a specific: one case was cured clinically and bacteriologically (under observation for 12 months) in one treatment of 40 minutes.

On visiting Prof. Wagner-Jauregg's clinic in Vienna I found that the method generally in use for

[1] Ann. Internal Med., 1932, vi., 457.

the treatment of G.P.I. was direct injection of blood from a malarial patient. The "fever machine" had been tried, but unfortunately on maniacal patients, with results disastrous to the machine, and had therefore been abandoned. I am informed that the same thing happened in Paris at the Rockefeller Institute. Prof. Wagner-Jauregg kindly gave me two interviews in which he discussed the possibilities of radiothermy. In a critical survey [2] of the various methods for inducing pyrexia which are now available he has declared his doubt whether the actual raising of the body temperature is the factor which is useful in malarial therapy. Inoculated malaria which runs its course without fever may, he says, be effective, and he quotes Major F. H. Stewart as having obtained good results, with the minimum of febrile disturbance, from tryparsamide treatment. He speaks of the need for adequate control observations over a sufficient period before any conclusions can be reached about the value of radiothermy. It seems to me, however, that the observations already published by Dr. Hinsie and Dr. Blalock [3] go far towards fulfilling his demands. They compare the results of radiothermy in 68 cases of G.P.I. with results obtained in 68 control cases, and find that in each series rather more than half the patients showed improvement. The clinical remission percentage was 17·6 in the group treated by radiothermy as compared with 19·1 in those who had malaria. The observations were made over a period of about 19 months and surveyed some six months after the completion of treatment.

I am, Sir, yours faithfully,

DUMARESQ LE BAS,
M.R.C.S. Eng., L.R.C.P. Lond., F.R.G.S.

Alston, Cumberland, Jan. 18th, 1934.

POTENCY OF VITAMIN PREPARATIONS

To the Editor of THE LANCET

SIR,—We have read with a large measure of agreement the observations of Prof. Drummond and those of Messrs. Bacharach and Evers on the standardisation of proprietary vitamin preparations. In the cases of vitamins B_1 and D the substances employed for the standard exert actions identical with those of the respective vitamins, and the adoption of these provisional standards presented no difficulty to manufacturers who standardise their products by biological methods; but in the case of vitamin A the position is different, since carotene, provisionally adopted as the standard, does not seem to act precisely as vitamin A.

In some early work on carotene we found that the basal diet (which includes the solvent oil in which the carotene is dissolved) had a very marked influence on the magnitude of the dose required to obtain a given effect—a fact that we had also observed with regard to other sources of vitamin A (Chem. and Industry, 1932, li., 260; Biochem. Jour., 1933, xxvii., 69). In view of this knowledge, directly the standard was available we carried out assays of oils including two which had been examined in another laboratory. Our results gave the same ratio between these two oils, but, in terms of the international standard, the figures obtained in the other laboratory were about six times as great as ours. We understand that results obtained by other workers have been just as much at variance. One factor which undoubtedly plays a part in these differences is the solvent in which the carotene is dissolved for administration to the animals. We have gone into this question fully and hope shortly to publish the results, which show that different oils vary greatly in their suitability as solvents, and that there may even be great differences between different samples of the same oil.

We agree with Mr. Evers that chemical and physical tests are more expeditious and less costly than the biological test. In our opinion the present indications are that chemical and physical tests will finally provide a more accurate basis of evaluation. We are making a study of the exact relationship between the Carr-Price blue value, the extinction coefficient determined by spectrophotometry, and the biological activity of preparations of vitamin A, and we hope to publish our results in the near future. We have already shown that the Carr-Price blue value of purified vitamin A bears a constant relationship to the extinction coefficient determined by spectrophotometry.

Until experts in the testing of vitamins have reached a greater measure of agreement it would appear better not to confuse clinicians by the use of a unit based on the carotene standard, but to rely upon the Carr-Price test and the spectrophotometric determinations.

We are, Sir, yours faithfully,

SYDNEY K. CREWS,
KATHLEEN CULHANE,
S. W. F. UNDERHILL.

The British Drug Houses, Ltd., Graham-street, N.1, Jan. 23rd, 1934.

To the Editor of THE LANCET

SIR,—As well as expressing appreciation of Prof. Drummond's timely observations on the use of recognised standards for the assay of vitamin activity, I should like to emphasise the especial importance of using such means of measurement in the case of vitamin B_1. As regards the B complex much confusion has arisen as the result of the employment of many different methods of comparison in the past, for example the vitamin-B content of foods has been estimated on a percentage basis, in comparison with both yeasts and wheat germ as standard; the Sherman unit also has been much used, particularly in America, where it is still employed notwithstanding the fact that Sherman himself abandoned its use nearly two years ago. This unit, depending on the rate of rat growth under standard conditions, is a smaller unit than the international standard unit provisionally adopted. Unless it is made clear by manufacturers which particular unit has been employed, any figures quoted are bound to give rise to confusion and may even bring discredit on vitamin-B therapy. Naturally, a relatively inactive substance used on account of vitamin activity measured on a small-unit basis, and believed by the medical practitioner to be a good source of the vitamin, will not in practice give the effects expected and which would have been given by any substance with the true vitamin activity believed to be present.

Our standardisation department welcomes the use of the international standard as a means of overcoming this difficulty and of getting a true standard of comparison between substances investigated by various workers. Its general use would save time and labour and do much to clear up the confusion which has existed in this field. The international standard unit for vitamin B_1 has been the basis of all our standardisation work for at least eight months.

I am, Sir, yours faithfully,

H. C. H. GRAVES, B.Sc.,
The Bemax Laboratories.

Hammersmith, W., Jan. 22nd, 1934.

[2] Wien. med. Woch., 1932, lxxxii., 328.
[3] Psychiat. Quart., 1932, vi., 191.

BATTLE OF THE BARBITURATES

To the Editor of THE LANCET

SIR,—Dr. Macintosh says, rather ungraciously to my way of thinking, that, "with one exception, the article by Sir James Purves-Stewart and Sir William Willcox in THE LANCET of Jan. 6th (p. 6) proves nothing but that fantastically large doses of the barbiturates may be combated successfully by energetic measures." He gives no credit to the great skill of two physicians who succeeded in saving the life of a woman who had taken 475 grains of a barbiturate. The mere fact that they have shown what energetic measures can do in a desperate case of this sort is a very definite advance in the treatment of a common and dangerous form of poisoning—the knowledge of which I am certain the profession will be most grateful for.

The fact that Dr. Macintosh does not give nembutal by the mouth does not, so far as I can see, give that procedure its death blow. I know of anæsthetists who do adopt this procedure—and with safety.

I am, Sir, yours faithfully,

Ulster-place, N.W., Jan. 17th. A. GRAHAM-STEWART.

M.M.S.A. AND D.C.O.G.

To the Editor of THE LANCET

SIR,—The leading article in your issue of Jan. 20th concerning the institution of the diploma of the College of Obstetricians and Gynæcologists is somewhat misleading in that it would appear to suggest that up to the present no provision had been made which embraced the objects of the new diploma and the ground covered by the proposed examination. May I, therefore, be allowed to recall that the diploma of Mastery of Midwifery of the Society of Apothecaries, examinations for which have been held twice yearly since 1928, was in like manner designed to assist the public health authorities and others in the selection of practitioners who have made a special study of, and proved themselves expert in, antenatal care, obstetrics, and infant welfare?

The public health side of the examination for the Mastery of Midwifery was further strengthened by the introduction last year of a special examination paper on "public health aspects of maternity and child welfare," which is set and marked by examiners of wide experience holding public health appointments. The examination therefore now has three written papers (obstetrics, pædiatrics, and public health aspects) followed by full oral and clinical tests, and candidates are not admissible unless they are on the British Register and have held a registrable diploma for at least three years, and have complied with the regulations with regard to the appointments they have held.

I am, Sir, yours faithfully,

HENRY COOPER,
Group Captain; Registrar, Society of Apothecaries of London.

Jan. 23rd, 1934.

PANEL AND CONTRACT PRACTICE

Doctors and Chemists

A COMMON experience for an insurance doctor is to be asked by an insured person whether his medicine had been altered as the last bottle looked and tasted differently from the previous. The position which then arises is not quite easy to deal with. The practitioner may have written something different in the last prescription, and in the absence of a note to the contrary on the patient's FMR he may not remember, at the time the question is asked, exactly what was ordered. Here the presumption is that the change in medicament initiated by the doctor has been properly dispensed. Supposing, however, he is certain that he did order the same medicine as before, he is still to be strongly advised not to jump to the conclusion that the medicine has been incorrectly dispensed. The taste of a patient varies in its acuity from day to day, and is not a trustworthy basis for an accusation against the chemist. In a recent case the doctor seized the medicine alleged to be faulty and sent it up to the insurance committee for analysis. Meanwhile the patient was advised to change his chemist, and the impression obviously left on his mind by the doctor's action and advice that the chemist had made a mistake—not a difficult impression to foster as the patient had stated in his complaint that his medicine looked and tasted differently from that to which he was accustomed. The analysis, when completed, showed that the medicine seized had been accurately dispensed. Assuming that the doctor had written three identical prescriptions at weekly intervals, and that the third bottle was correctly stated by the patient to be different from the first, then since the third was found to be correctly dispensed, it must have been the first or the second (or both) that were wrong. And of these, unfortunately for the doctor, there was no sample to examine. The matter had to be left resting upon the patient's impression of differences in the mixtures he obtained.

It should be remembered that there are certain stock preparations, made by different firms quite accurately according to B.P. standards, which vary both in colour and taste. Such a preparation is the compound infusion of gentian. If a chemist bought his infus. gent. co. from firm A and, when that stock was used up, changed to firm B, the resulting mixture accurately dispensed from identical prescriptions will appear and taste quite differently. In such a case it would be prudent to visit the chemist and inquire the reason for the change complained of before assuming that the prescription was not accurately dispensed or advising the patient to go to another chemist. It has always been held that no doctor is entitled to advise a patient to go to a particular chemist, although a search of the regulations fails to reveal any such rule. There is in the Terms of Service § 9 (10) a regulation in which "Rep. Mist." is prohibited, and it has been suggested that this was prohibited because it did not enable an insured person to go to any chemist he liked, for obviously no chemist could repeat a mixture if he had not made up the original mixture. But this appears to be reading a great deal into the regulation. There is ample reason for prohibiting "Rep. Mist." without the help of "the selection of chemist" argument; the use of the formula is liable to cause mistakes by putting the onus on the chemist to repeat the proper medicine. Now that it is prohibited there does not appear to be any reason why a doctor should not tell his insured patient the name of a chemist to go to.

In his last quarterly report to the London Panel Committee Dr. A. F. Heald returns to the difficulty that exists in London in getting medicines dispensed after 8 P.M. Some insured persons, he says, unable to reach their homes until late in the evening, consult their doctor and get a prescription which they

then can find no chemist to dispense. The question of urgency scarcely arises. Whether the prescription is marked urgent or not they cannot get it made up. This is a matter for the insurance committee to take up with the chemists. There is no difficulty with the Shop Hours Act, as this relates only to the sale of ordinary non-perishable goods and would not prevent a chemist remaining open (by rota) for the dispensing of medicines. The hours of service sub-committee if it were to meet would find this late dispensing problem give them something to discuss.

Changing Doctors

Practitioners still find these regulations irksome. It frequently happens that an insured person gives notice to his insurance committee on (say) Nov. 15th to change his doctor and forwards his medical card. This card is returned to him with instructions. He perhaps does not read these instructions or misunderstands them, but considers himself (with the return of the card) to have been placed on the new doctor's list. When necessity arises for treatment with the new doctor he is told he is not on the new doctor's list, and he has to go through the whole process again. The fault here is of course with the insured person who has not read his instructions. But there is this excuse for him. He can say, I have been to the new doctor and told him I wanted to change to his list, and I have told the insurance committee I want to change, why could not they put the matter through at the time without my having to go again to the doctor with the returned medical card containing this red slip. The regulations are really designed to make the change not too easy, to give the insured person in fact some trouble in making it. It would seem that he might say when writing to the insurance committee that he had been to Dr. X who had agreed to accept him, and that the insurance committee could then forward his card to Dr. X for acceptance.

MEDICAL NEWS

University of Oxford

The vice-chancellor has appointed Mr. P. N. B. Odgers, reader in human anatomy in the university, to be deputy for the Dr. Lee's professor of anatomy during the Hilary term.

The Francis Gotch memorial prize for 1933 has been awarded to E. H. Leach, Oriel College.

University of London

On Mondays, at 5 P.M., from Feb. 12th to March 19th, Mr. H. R. Ing, D.Phil., will lecture on chemical structure and pharmacological action in the physiology theatre of University College, Gower-street, W.C. On Wednesdays from Feb. 7th to March 14th, at 5 P.M., six lectures on cytology will be given by Mr. R. J. Ludford, D.Sc., Mr. E. S. Horning, and Dr. K. C. Richardson. These lectures will also be given at University College.

University of Birmingham

Dr. F. W. M. Lamb, lecturer in pathology in the university, has been appointed professor of toxicology and medical jurisprudence in the University of Cairo.

Hunterian Society

A banquet to commemorate the 206th anniversary of the birth of John Hunter will be held at the May Fair Hotel, Berkeley-street, London, W.1., on Thursday, Feb. 8th. The hon. secretary may be addressed at 79, Wimpole-street, W.1.

Royal Microscopical Society

The new president of this society is Prof. W. A. F. Balfour-Browne, and the vice-presidents Mr. J. E. Barnard, F.R.S., Mr. Conrad Beck, Prof. D. M. Blair, M.B., and Dr. G. M. Findlay. The senior hon. secretary is Prof. R. T. Hewlett, M.D., and the council includes Dr. A. S. Burgess and Dr. J. E. McCartney.

Royal Sanitary Institute

A meeting will be held at this institute, 90, Buckingham Palace-road, London, S.W., on Thursday, Feb. 15th, at 5.15 P.M., when Dr. James Fenton, medical officer of health for Kensington, will open a discussion on the administration of the Housing Acts in relation to unfit individual houses. Lord Balfour of Burleigh will be in the chair.

The health congress arranged by this institute will be held at Bristol from July 9th–14th under the presidency of Mr. Stanley Badock, pro-chancellor of the university. The work of the congress will be divided into sections dealing with preventive medicine; engineering, architecture, and town planning; maternity, child welfare, and school hygiene; veterinary hygiene; national health insurance; and hygiene of food. Among the special conferences which will be arranged will be one for medical officers of health. The secretary of the institute may be addressed at 90, Buckingham Palace-road, London, S.W.1.

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—E. H. E. Cross, St. Mary's Hosp.; D. P. King, Univ. of Cambridge and Guy's Hosp.; I. B. McCrae, Charing Cross Hosp.; H. Paroulakis, Univ. of Innsbruck and St. Mary's Hosp.; and P. H. Willcox, Univ. of Cambridge and St. Mary's Hosp.

Medicine.—E. C. Dax, St. Mary's Hosp.; E. G. Houghton, Univ. of Cambridge and St. George's Hosp.; I. B. McCrae, Charing Cross Hosp.; and S. Smith, Univ. of Liverpool.

Forensic Medicine.—T. Gardner, Univ. of Leeds; G. R. Greene, St. Mary's Hosp.; E. G. Houghton, Univ. of Cambridge and St. George's Hosp.; H. R. Kasday, Middlesex Hosp.; I. B. McCrae, Charing Cross Hosp.; R. M. Outfin and T. Sherman, Guy's Hosp.; and D. Walton, Univ. of Manchester.

Midwifery.—F. G. S. Alderson, Univ. of Leeds; S. A. De Souza, St. Mary's Hosp.; H. O. Dole, Univ. of Manchester; J. C. Harvey, St. George's Hosp.; I. B. McCrae, Charing Cross Hosp.; J. R. Owen, Univ. of Cambridge and St. Mary's Hosp.; H. Sobhi, Univ. of Cairo and St. Bart.'s Hosp.; and H. M. R. Waddell, Univ. of Manchester and Charing Cross Hosp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine surgery, and midwifery: T. Gardner, E. G. Houghton, I. B. McCrae, and S. A. De Souza.

Mental After Care Association

This association, which was founded in 1879, is appealing for help to carry on and extend its work for recovered patients, and also for the early care of those suffering from nervous and mental illness, for whom it provides homes of recovery and expert care. Particulars of its work may be had from the secretary, at Church House, Dean's-yard, Westminster, S.W.1.

Medical Congresses in Germany

The forty-sixth meeting for the Deutsche Gesellschaft für Innere Medizin is to be held at Wiesbaden from April 9th-11th under the presidency of Prof. Schittenhelm of Kiel. The first day will be devoted to the discussion of problems relating to heredity, with papers by Prof. Eugen Fischer (Berlin), Freiherr von Verschuer (Berlin), and Prof. Otto Naegeli (Zürich). On Tuesday Prof. Otfried Foerster (Breslau) will read a paper on localisation in the nervous system. On the third day papers will be read on the sex hormones by Prof. A. Butenandt (Danzig) and on ovarian function by Prof. Robert Schröder (Kiel). On the last day of the congress there will be a joint meeting with the Gesellschaft für Verdauungs- und Stoffwechselkrankheiten, when there will be a discussion on vitamins. The secretary is Dr. A. Géronne of Wiesbaden.

The seventh congress of the Deutsche Gesellschaft für Kreislaufforschung will take place at Bad Kissingen on April 16th and 17th under the presidency of Prof. J. Nörr of Munich. The main subject for discussion will be thrombosis and embolism and the principal speakers will be Prof. L. Aschoff (Freiburg), Prof. P. Morawitz (Leipzig), and Prof. L. Nürnberger (Halle). The hon. secretary for the congress is Prof. Eb. Koch, Bad Nauheim.

It was announced last week that Sir Gowland Hopkins, Prof. E. P. Cathcart, and Prof. Edward Mellanby, as physiologists representing the Minister of Health's advisory committee on nutrition, were to confer with Prof. V. H. Mottram, Prof. S. J. Cowell, and Dr. G. P. Crowden, as physiologists representing the British Medical Association committee on nutrition, in regard to the differences which appear to exist between the two committees concerning the amount of calories and first-class protein appropriate as a basis for suitable diets.

Tulane University of Louisiana, New Orleans

The first presentation of the Matas award in vascular surgery, created by the establishment of the Violet Hart fund in this university, has been made to Dr. Mont R. Reid of Cincinnati, Ohio.

Harveian Society of London

The following have been elected officers of the society for the next session.

President, Dr. A. Hope Gosse; vice-presidents, Dr. R. Cove-Smith, Dr. Tom Hare, Dr. L. E. C. Norbury, and Dr. G. E. Orme; treasurer, Mr. C. P. G. Wakeley; hon. secretaries, Dr. T. C. Hunt, and Dr. A. D. Morris; council, Dr. J. Bamforth, Dr. F. S. Cooksey, Mr. E. A. Crook, Lt.-Col. E. L. Gowland, Dr. C. Nixon Groves, Dr. N. Gray Hill, Dr. Norman Hill, Dr. V. S. Hodson, Dr. A. F. Morcom, Mr. H. Rivers Pollock, Mr. W. E. Tanner, and Mr. A. Dickson Wright.

Instruction in Venereal Diseases

A post-graduate course on modern methods in the diagnosis and treatment of venereal diseases will begin at the Salford municipal clinic on March 1st. It is intended primarily to enable those attending it to obtain the Ministry of Health certificate, without which no one can hold the post of venereal diseases officer. To qualify for this certificate a course lasting three months must be taken. Applications must reach Lieut.-Colonel E. T. Burke, at the Municipal Clinic, 155, Regent-road, Salford, 5, Lancs, before Feb. 19th.

University of London Medical Graduates Society

A conversazione for members of this society and other medical graduates of the University of London will be held at B.M.A. House, Tavistock-square, W.C., from 3.30 to 6 P.M., on Thursday, Feb. 15th. At 4.30 P.M. Major H. Lockwood Stevens will show a film entitled Round the Empire on the Track of Malaria, and from 5.15 P.M. there will be conducted tours to see, among other things, the setting-up of the *British Medical Journal*. Application for tickets should be made before Feb. 7th to the hon. secretaries of the society at 11, Chandos-street, W.1.

National Hospital, Queen-square

A post-graduate course is now being held at this hospital and will continue until March. Every week-day, except Saturday, there are out-patient clinics at 2 P.M., and lectures and clinical demonstrations at 3.30 P.M. At noon on Wednesdays there are demonstrations of post-mortem material, and on Thursdays lectures on the pathology of the nervous system by Dr. J. G. Greenfield; on Tuesdays there are demonstrations on the anatomy and physiology of the nervous system at noon by Dr. Purdon Martin; and on Mondays demonstrations on neurological ophthalmology will be given at 4.30 P.M. Further particulars may be had from the secretary of the hospital, Queen-square, London, W.C.1.

Association of Clinical Pathologists

A meeting of this association will be held in the inoculation department of St. Mary's Hospital, London, W., to-day, Saturday, Jan. 27th, beginning at 9.45 A.M. The main subject for discussion is the prognosis in meningitis other than tuberculous or meningococcal. Lord Horder will read a paper on coccal meningitis, and reports of recovered cases will be given by Dr. S. C. Dyke, Dr. J. G. Greenfield, Dr. Harwood Little, and Dr. Cuthbert Dukes. Other speakers will be Prof. G. S. Wilson, on the diagnosis of *Brucella abortus* infections; Dr. H. J. Parish, on staphylococcus haemolysin, toxoid and antitoxin; Dr. B. G. Maegraith, on a precipitin test in cerebro-spinal fever; and Dr. E. L. Sturdee, on recent statistics of the therapeutic effect of antimeningococcal serum. The secretary of the association is Dr. S. C. Dyke, the Royal Hospital, Wolverhampton.

Child Guidance Council

The annual meeting of this council was held on Jan. 2nd at the Westminster Palace Rooms. Lord Blanesborough, the president, spoke of the generosity of the Commonwealth Fund in assisting to found the movement and to maintain it. Lady Snowden, illustrating the great steps that had been made in the understanding of the child mind, said that as a school teacher in the north country she had been required to treat all children in the same way, exacting from them the same amount of work and the same success in every department of it. She had been instructed to gain these results by long hours of detention, making recalcitrant children objects of contempt. Dr. William Moodie said that the council was now five years old. There was a definite improvement in the general understanding of its methods. The clinics were under medical direction and adopted the three-specialist system, combining a psychiatrist, an educational psychologist, and a social worker. They trained social workers for the adult as well as the child field. The reports were couched in language that anyone could understand, and the findings were in harmony with common sense and community feeling. Case-work observed the rights of the group as well as of the individual, and its results indicated reasonable discipline and control and the more intensive occupation of children, with special adaptation of school and home life for the unusual.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

J. G. Sliman to be Surg. Lt.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Sub-Lts. D. R. Hughes and A. E. Williams to be Surg. Lts.

Prob. Surg.-Lt. P. C. Lewis to *Effingham*.

ROYAL ARMY MEDICAL CORPS

TERRITORIAL ARMY

Capt. J. A. Bingham to be Maj.

Supernumerary for service with O.T.C.—Capt. W. P. Kennedy is secd. under para. 135 T.A. Regs.

INDIAN MEDICAL SERVICE

Capt. J. H. Crawford resigns his commn.

Dr. J. Grimston has been appointed Admiralty Surgeon and Agent for Southampton, and Dr. I. M. D. Grieve for the East London district.

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

THURSDAY, Feb. 1st.—8.15 P.M., TROPICAL DISEASES AND PARASITOLOGY. Dr. Malcolm Smith: The Classification of Snakes by their Teeth and the Evolution of the Poison Fang. Dr. N. Hamilton Fairley: Snake Bite, its Mechanism and Modern Treatment. Members of the Section of Comparative Medicine are specially invited to take part in the discussion.

FRIDAY.—10.30 A.M., OTOLOGY. (Cases at 9.30 A.M.) Discussion on Treatment of Chronic Catarrhal Otitis Media (excluding otosclerosis), and of Deafness in Dry Suppurative Otitis Media, to be opened by Mr. W. M. Mollison and Mr. C. P. Wilson. 5 P.M., LARYNGOLOGY. (Cases at 4 P.M.) Mr. Cecil Strong (Birmingham): The Innervation and Vascular Supply of the Antrum. Members of the Section of Odontology are specially invited to attend the Meeting. 8.30 P.M., ANÆSTHETICS. Discussion: Modern Views on Respiration. Part I. Normal Breathing: Prof. Samson Wright. Part II.: Respiratory Failure: Dr. Alan Moncrieff.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY, Feb. 2nd.—8.30 P.M. (at the Hotel Rembrandt, Brompton-road, S.W.), Discussion on Practical Psychotherapy, to be opened by Mr. H. Scott, Governor of H.M. Borstal Institution, Portland, Dr. T. A. Ross, and Dr. W. G. Wyllie. Preceded by a dinner at 7.30 P.M.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, Jan. 30th.—5 P.M., Dr. A. M. H. Gray: Sarcoids.

THURSDAY, Feb. 1st.—5 P.M., Dr. J. A. Drake: Streptococcal Affections of the Skin.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY, Jan. 29th.—5 P.M., Mr. A. Sorsby: Retinal Abiotrophy.
WEDNESDAY.—5 P.M., Mr. K. H. Watkins: Bladder Function in Low Spinal Injury.
FRIDAY, Feb. 2nd.—5 P.M., Mr. E. G. Muir: Carcinoma of the Prostate. (Hunterian lectures.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Jan. 29th, to SATURDAY, Feb. 3rd.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Course in Dermatology. Afternoons and evenings. (Practical Pathology arranged if desired.) (Open to non-Members.) —MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W. Lecture-demonstration on Organic Dyspepsia, by Dr. A. E. Clark-Kennedy, on Tues., at 2.30 P.M. to 4 P.M.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily by arrangement with the Fellowship of Medicine. Courses of instruction, clinics, lectures, &c., arranged by the Fellowship of Medicine are open only to Members and Associates, unless otherwise stated.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, Jan. 29th.—10 A.M., Medical Wards, Skin Clinic. 11 A.M., Surgical Wards. 2 P.M., Surgical and Gynæcological Wards, Medical, Surgical, Eye, and Gynæcological Clinics, Operations. 4.15 P.M., Lecture, Mr. Addison: Genito-urinary Surgery in Childhood.
TUESDAY.—10 A.M., Medical Wards. 11 A.M., Surgical Wards. 2 P.M., Medical, Surgical, and Throat Clinics, Operations. 4.15 P.M., Lecture, Mr. Green-Armytage: The Fevers of Pregnancy.
WEDNESDAY.—10 A.M., Medical Wards, Children's Clinic, Children's Wards. 2 P.M., Medical, Surgical, and Eye Clinics, Gynæcological Operations.
THURSDAY, Feb. 1st.—10 A.M., Neurological Clinic. 11 A.M., Fracture Clinic. 2 P.M., Medical, Surgical, Eye, and Genito-urinary Clinics, Operations. 4.15 P.M., Lecture, Dr. Shaw: Thyrotoxicosis.
FRIDAY.—10 A.M., Skin Clinic. 12 noon, Lecture on Treatment. 2 P.M., Medical, Surgical, and Throat Clinics, Operations. 4.15 P.M., Lecture, Mr. Vlasto: Vertigo.
SATURDAY.—10 A.M., Medical and Surgical Wards, Children's and Surgical Clinics.
The Lectures at 4.15 P.M. are open to all Medical Practitioners without fee.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, Jan. 29th.—2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Kinnier Wilson: Infective Diseases of the Nervous System (3).
TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Critchley: Familial Disease (2). Basal Ganglia.
WEDNESDAY.—2 P.M., Dr. Martin: Out-patient Clinic. 3.30 P.M., Dr. James Collier: Clinical Demonstration.
THURSDAY, Feb. 1st.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Kinnier Wilson: Infective Diseases of the Nervous System (4).
FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Dr. James Collier: Peroneal Atrophy, &c.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY, Jan. 31st.—4 P.M., Dr. Scott Pinchin: Difficulties in the Diagnosis of Pulmonary Disease.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, Feb. 2nd.—4 P.M., Mr. A. L. Yates: Threatening Mastoiditis.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.
THURSDAY, Feb. 1st.—4.30 P.M., Dr. F. J. Poynton: Prevention of Rheumatism. 9 P.M., Mr. John Hunter: Surgical Treatment of Pulmonary Tuberculosis.

LEEDS GENERAL INFIRMARY (Post-graduate Clinic).
TUESDAY, Jan. 30th.—4 P.M., Mr. Moir: Demonstration of Surgical Cases.

GLASGOW POST-GRADUATE LECTURES.
TUESDAY, Jan. 30th.—3.30 P.M. (in the Faculty Hall, Vincent-street), Dr. H. W. Thomson: Recent Relationship of Ophthalmology to General Medicine.
WEDNESDAY.—(In the Royal Hospital for Sick Children), Mr. A. MacLennan: Surgical Cases.

Appointments

DAVIDSON, W. CAMERON, M.B., Ch.B. Glasg., has been appointed Hon. Physician in charge of Out-patients to the Torbay Hospital.
PLATT, R., M.D., Ch.B. Sheff., M.R.C.P. Lond., Hon. Physician, Royal Infirmary, Sheffield.

Vacancies

For further information refer to the advertisement columns

Ashton-under-Lyne District Infirmary.—H.S. At rate of £150.
Aylesbury, Royal Buckinghamshire Hospital.—Res. M.O. At rate of £200.
Birkenhead Infirmary.—Res M.O. £300.
Birmingham, St. Chad's Hospital.—Res. M.O. £100.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.P. At rate of £120.
Bradford Royal Infirmary.—Two H.S.'s. Each at rate of £135.
Brighton, New Sussex Hospital for Women and Children.—H.S. £100.
Brighton, Royal Sussex County Hospital.—Hon. Dental Surgeon and Hon. Asst. Dental Surgeon.
Bristol General Hospital.—H.S. to Spec. Depts. At rate of £80.
Canterbury, Borough Mental Hospital.—Asst. M.O. £350.
Cardiff, Welsh National School of Medicine.—Sen. Asst. in Medical Unit. £500.
Central London, Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Third Res. H.S. At rate of £75. Also Hon. Second Asst. for Out-patient Dept.
Chesterfield and North Derbyshire Royal Hospital.—H.S. At rate of £150.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Colchester, Essex County Hospital.—Asst. H.S. £120.
Durham County Council.—District Tuber. M.O. £500.
Durham County Mental Hospital.—Asst. M.O. £350.
Eastern Dispensary, Leman-street, E.—Dental Anæsthetist.
Gloucestershire Education Committee.—School Medical Inspector. £500.
Guildford, Royal Surrey County Hospital.—Hon. Dermatologist.
Hastings, Royal East Sussex Hospital.—Asst. Pathologist. £300.
London Jewish Hospital, Stepney Green, E.—M.O. for Actino- and Physio-Therapeutic Dept. £100.
London Lock Hospital, 91, Dean-street, W.—Res. M.O. to Male Depts. At rate of £175.
London Lock Hospital, 283, Harrow-road, W.—Res. M.O. to Female Depts. At rate of £175.
Manchester, Ancoats Hospital.—Two H.S.'s. Each at rate of £100.
Manchester, Northern Hospital for Women and Children.—Jun. H.S. £100.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Manchester Royal Infirmary.—Hon. Asst. Surgeon.
Manchester, St. Mary's Hospitals.—Asst. M.O. for Children's Out-patient Dept. At rate of £150.
Middlesbrough, North Riding Infirmary.—Sen. H.S. £200.
Newcastle-on-Tyne, Wooley Sanatorium.—Asst. M.O. £350.
Nottingham General Hospital.—Res. Cas. O. and H.S. At rate of £200 and £150 respectively.
Preston, Biddulph Grange Orthopædic Hospital.—Jun. H.S. At rate of £150.
Prince of Wales's General Hospital, N.—M.O. for V.D. Clinic. £400.
Queen's Hospital for Children, Hackney-road, E.—H.S. and Cas. O. Each at rate of £100.
Royal Dental Hospital of London, 32, Leicester-square, W.C.—Two Hon. Asst. Anæsthetists.
Royal Masonic Hospital, Ravenscourt Park, W.—H.P., Surgeons, &c.
Royal National Orthopædic Hospital, 234, Gt. Portland-street, W. Locum H.S. At rate of £150.
St. Giles' Hospital, Brunswick-square, S.E.—Clinical Asst. At rate of £100.
St. Helens County Borough.—Deputy M.O.H. £700.
St. James' Hospital, Ouseley-road, Balham, S.W.—Temp. Asst. M.O. At rate of £250.
St. Mary's Hospital, Institute of Pathology and Research, W.—Research Studentship. At rate of £200.
St. Stephen's Hospital, Fulham-road, S.W.—Clinical Asst. At rate of £100.
Salford, Hope Hospital.—Asst. Res. M.O. At rate of £200.
Salisbury, General Infirmary.—H.S., H.P., and Cas. O. Each at rate of £125.
Sheffield, Lodgemoor Infectious Diseases Hospital.—Jun. Asst. M.O. £200.
South Africa Union.—Specialist Serologist. £950.
Southend-on-Sea General Hospital.—Res. Obstet. and Gynæc. Officer. Also First H.S. At rate of £125 and £100 respectively.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Asst H.P. £125.
Torquay, Torbay Hospital.—H.P. and H.S. Each £175.
Warrington Infirmary and Dispensary.—Jun. H.S. £150.
Warwick County Mental Hospital, Hatton.—Second Asst. M.O. £400.
Western Ophthalmic Hospital, 155, Marylebone-road, N.W.—Jun. Res. H.S. At rate of £100.
Willesden Corporation.—Asst. M.O. £600.
Windsor, King Edward VII. Hospital.—Hon. Asst. Anæsthetist.
Wolverhampton Royal Hospital.—H.S. to Ear, Nose and Throat Dept. At rate of £100.
The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Inverness, Inverness; and Comrie, Perth.

Births, Marriages, and Deaths

BIRTHS

MURPHY.—On Jan. 10th, at a nursing-home, Reading, the wife of Dr. M. F. Murphy, of a son.
SHAKESPEARE.—On Jan. 15th, at Ipswich, the wife of Major W. G. Shakespeare, R.A.M.C., of a daughter.

DEATHS

GARDNER.—On Jan. 17th, at Marston Ferry-road, Oxford, Frank Gower Gardner, M.R.C.S., County Director of the Red Cross for Oxfordshire, formerly of Warwick, aged 71.
LEWIS.—On Jan. 22nd, at Birch Cottage, Shortlands, Cecil Ernest Millington Lewis, M.D., aged 66.
WOLSTENHOLME.—On Jan. 17th, in a Manchester nursing-home, Col. T. B. Wolstenholme, O.B.E., T.D., late A.D.M.S., 42nd (East Lancs) Division.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

ADVERTISING VITAMINS

IN June, 1931, a conference of experts, sitting in London under the chairmanship of Prof. E. Mellanby, made some recommendations for standardising the vitamins which the state of knowledge then justified. It was agreed for instance at this conference to accept carotene as a provisional international standard of reference for vitamin A, and to hold a selected sample of cod-liver oil as a possible secondary standard; to adopt a solution of irradiated ergosterol as the standard for vitamin D; for vitamin B to use the adsorption product of the medical laboratory at Batavia (Java); for vitamin C the fresh juice of the lemon.

Since that time the United States Pharmacopœia has adopted these units for A and D, and although the standards are provisional they do form, as Prof. J. C. Drummond pointed out in our correspondence columns a fortnight ago, some sort of base line upon which to correlate the results of assays made in different laboratories. In his letter Prof. Drummond asked that statements regarding the vitamin potency of preparations should be expressed in terms of these provisional international units, and he deprecated specially such vague claims as that a product is rich in vitamins. The correspondence which Prof. Drummond's letter has provoked shows how timely was his intervention.

It will interest readers to learn that the Swiss authorities have taken action in this direction, as may be read in detail in *Chemistry and Industry* for Jan. 19th (page 53). Switzerland, it is there remarked, has always had somewhat stringent food regulations and, perhaps we may add, with some reason, for Switzerland has always been the happy hunting ground of cranks and quacks of all kinds. Three years ago the Federal Service of Public Hygiene made it illegal to issue statements about the vitamin content of foods without a certificate from a recognised authority that the vitamin content had been notably increased by additions or by special treatment. The restrictions were good as far as they went, but did not give sufficient guidance to the Cantonal inspecting authorities, and these have now been armed with detailed instructions drawn up by the Federal Service with the assistance of university physiological institutes at Basle and Lausanne.

When permission has been given for a product to indicate a particularly high content of some vitamin it would be permissible to indicate generally in the advertising matter that vitamins are essential for a rational diet, especially for infants, and that among the substances known as vitamins the following have been recognised as indispensable for man—viz., the anti-xerophthalmic vitamin A, the anti-beriberi vitamin B_1, the anti-pellagra vitamin B_2, the anti-scorbutic vitamin C, and the anti-rachitic vitamin D. But the text of the advertisement must not give the impression that the product contains other vitamins than those mentioned in the authorisation, and in regard to each several vitamin the limit of what it is permissible to state is expressly set out. For instance, if a particularly high content of vitamin A has been certificated it may be mentioned that this vitamin is necessary for normal growth of the body, and that its absence lessens the resistance of the organism to infections. Packings and literature must always give accurate statements of the vitamin content in the foodstuffs, and the figures must be those of the official analysis; but it is forbidden to reproduce or mention recommendations or certificates, even if they have been provided by experts.

In cases of a rational combination of different vitamins it is permissible to mention each of them as well as their action even if their presence has only been confirmed in moderate quantity: but if in a food product the simultaneous presence of two vitamins has been stated, one in considerable and the other in unimportant quantity, the second may not be mentioned without expressly specifying the insufficiency of its quantity.

Although these instructions are approved they do not come into force until July 1st, giving those concerned time to dispose of advertising material which no longer conforms to them.

CHOLECYSTO-TYPHOID

THE occurrence of acute cholecystitis at the height of an attack of typhoid fever—especially in the third or fourth week—and also in convalescence is well known, but it is very unusual to encounter this complication at the onset. P. H. Hillemand, J. Mézard, and G. Valensi (Paris Méd., Jan. 13th, p. 47) record examples of this rare event in a woman aged 42 and a boy aged 14. In both cases the first symptoms to attract attention were pain and tenderness over the gall-bladder, resistance of the abdominal wall on palpation of the area, and the presence of a tender pyriform swelling below the margin of the loin, while the characteristic symptoms of typhoid fever did not appear until later. Both patients developed myocarditis but otherwise made an uncomplicated recovery. Similar cases of pretyphoid cholecystitis were recorded by Worms and Hamant in 1912, Roger and Collard in 1915, and Fournier, Bertolini, Alvarez, and Gath in 1928. These five cases justify the isolation of an atypical form of onset of typhoid fever which may be called cholecysto-typhoid on the analogy of pneumo-typhoid, meningo-typhoid, or arthro-typhoid. Clinically there is nothing to suggest the true nature of pretyphoid cholecystitis. In four of the recorded cases, including those of Hillemand and his colleagues, the diagnosis was not established until after the appearance of rose spots as the result of blood culture. Fournier and his collaborators however emphasise the diagnostic importance of early epistaxis and the value of leucopenia occurring in acute cholecystitis.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 13TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 13 (last week 3); scarlet fever, 3290; diphtheria, 1256; enteric fever, 15; acute pneumonia (primary or influenzal), 1867; puerperal fever, 61; puerperal pyrexia, 135; cerebro-spinal fever, 34; acute poliomyelitis, 8; acute polio-encephalitis, 1; encephalitis lethargica, 8; dysentery, 23; ophthalmia neonatorum, 96. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 16th–17th was as follows: Small-pox, 20 under treatment; 2 under observation (last week 14 and 0 respectively); scarlet fever, 2569; diphtheria, 2071; enteric fever, 7; measles, 997; whooping-cough, 239; puerperal fever, 19 mothers (plus 11 babies); encephalitis lethargica, 260; poliomyelitis, 5; "other diseases," 242. At St. Margaret's Hospital there were 20 babies (plus 10 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 49 (14) from measles, 18 (4) from scarlet fever, 15 (3) from whooping-cough, 37 (2) from diphtheria, 34 (16) from diarrhœa and enteritis under two years, and 100 (19) from influenza. The figures in parentheses are those for London itself.

The deaths from influenza during the past few weeks (working backwards) have been as follows: 100, 109, 83, 97, 95, 70, 59. The 209 deaths during the first two weeks of the year compare with 1715 deaths for the corresponding weeks of 1933. Nine deaths were this week attributed to influenza at Birmingham, 3 each at Southend-on-Sea, Leicester, and Plymouth; no more than 2 in any other great town. Bradford reported the only death from enteric fever outside London. Eleven fatal cases of measles occurred at Manchester, 4 each at Leeds and Liverpool. Of the fatal cases of diphtheria, 6 were reported from Leeds, 3 each from Liverpool and Salford.

The number of stillbirths notified during the week was 244 (corresponding to a rate of 37 per 1000 total births), including 27 in London.